Amber Waves

contents

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FEATURES

10 Will Calorie Labeling in Restaurants Make a Difference?
Rosanna Mentzer Morrison, Lisa Mancino, and Jayachandran N. Variyam

A 2010 Federal law will require U.S. chain restaurants to display calorie information on their menus and menu boards. Will consumers use this information to make healthier food choices?

18 Income Growth in Developing Countries Can Increase U.S. Agricultural Exports
Birgit Meade, Andrew Muhammad, and Nicholas Rada

According to USDA long-term projections, continued income growth will make developing countries the main source of the projected increases in global food demand and trade.

26 Higher Carbon Prices Could Spur Adoption of Methane Digesters
Nigel Key and Stacy Sneeringer

Currently, methane digesters' costs often exceed their benefits to livestock producers, but higher prices in voluntary, regional, or national carbon markets could make them profitable for many operations.

FINDINGS

2 MARKETS AND TRADE
Chinese Apple Juice Export Growth Follows Investments in the Industry

Growing Beef Consumption in Japan Could Benefit U.S. Producers

Few Farms Participate in the Vegetable Planting Pilot Program

6 DIET AND HEALTH
Choosing Healthy Foods Is More Challenging for Teens

Americans Can Satisfy Dietary Guidelines for Vegetables and Fruit for Under $2.50 Per Day

8 FARMS, FIRMS, AND HOUSEHOLDS
Farmers Develop Strategies To Reduce Energy Input Costs

Contracting Expands for Field Crops

STATISTICS

34 Data Feature
Mapping Population and Economic Trends in Rural and Small-Town America

38 INDICATORS
Selected statistics on agriculture and trade, diet and health, natural resources, and rural America

Chinese Apple Juice Export Growth Follows Investments in the Industry

China is by far the world's largest supplier of apple juice concentrate, a key ingredient in consumer juice products and other beverages in the United States and other countries. About two-thirds of the U.S. apple juice supply now comes from China.

China's prominent role in apple juice trade is remarkable, considering that its juice industry barely existed until the early 1990s. The industry emerged after market reforms in the 1980s encouraged Chinese farmers to diversify their incomes by planting apples and other horticultural crops.

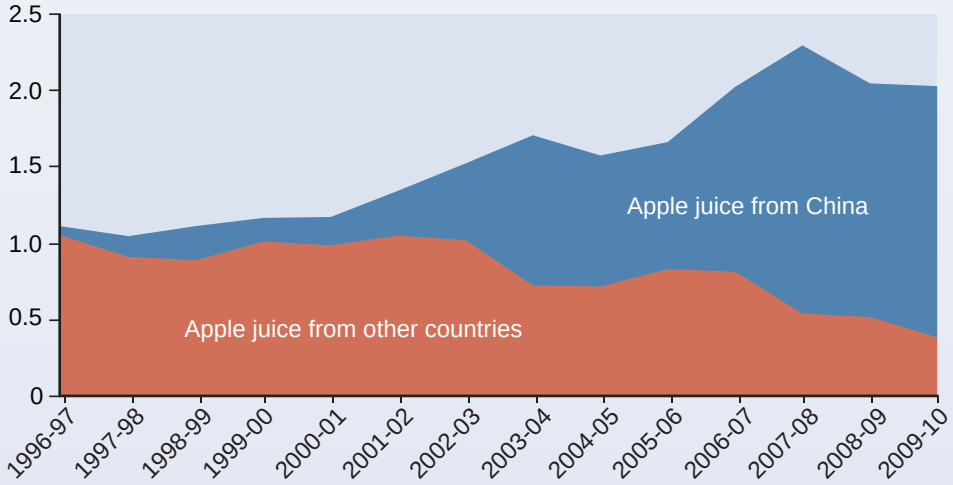
As production boomed, China's apple market was quickly saturated, and prices were depressed until a combination of Government, foreign, and private investment began building a juice processing industry that absorbed the glut of apples. The industry relied on exports for over 90 percent of its sales since apple juice is not traditionally part of the Chinese diet. The United States is the largest market.

Government officials, eager to expand markets for poor farmers, welcomed juice-processing companies. A vast network of apple-juice-processing plants now stretches from China's coast into its western provinces. Processors procure apples from brokers and traders who fan out into the countryside to buy apples from millions of farmers who tend small orchards. The apples are crushed to make juice concentrate, which is sold to large multinational food and beverage companies.

But recently, the supply of apples as raw materials for juice, which once seemed limitless, has tightened. Now that the industry consumes as much as a fourth of China's apple crop, juice processors sometimes bid against each other to procure apples. They also have to compete with a growing domestic market for fresh fruit. The result has been upward pressure on prices.

U.S. imports of apple juice from China grew sharply in 2000-2010

Billion liters



Note: Market year July-June.
Source: USDA, Economic Research Service analysis of data from USDA's Global Agricultural Trade System (GATS).

Processors are also finding it difficult to procure the high-acid apple varieties demanded by juice buyers. The market for higher priced fresh fruit attracts the best quality apples, and farmers prefer to plant sweeter varieties like Fuji favored by the fresh market.

Now that robust demand seems to have caught up with the apple supply, China's limited supply of raw material may act as a brake on the apple juice industry's growth.

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This finding is drawn from . . .

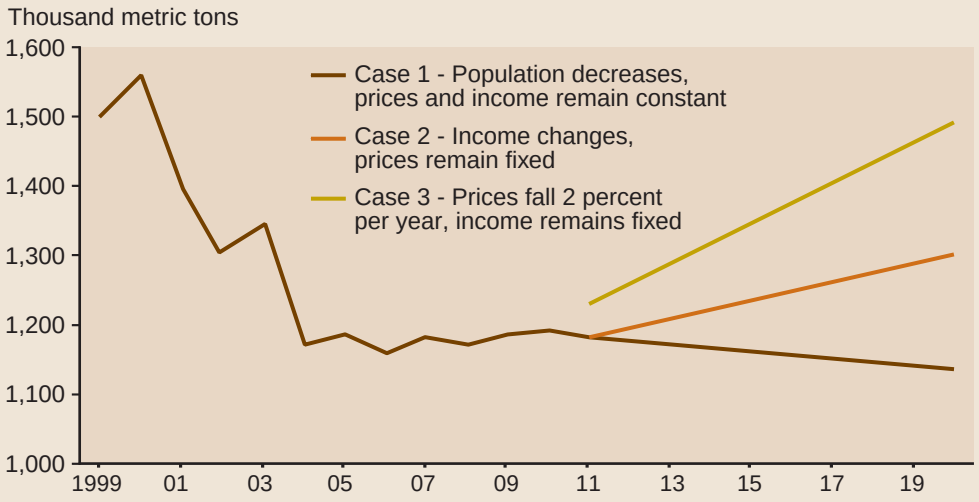
Investment in Processing Industry Turns Chinese Apples Into Juice Exports, by Fred Gale, Sophia Huang, and Yingying Gu, FTS-34401, USDA, Economic Research Service, October 2010, available at: www.ers.usda.gov/publications/fts/2010/10oct/fts34401/

Growing Beef Consumption in Japan Could Benefit U.S. Producers

Japan was once the largest export market for U.S. beef, importing as much as $1.6 billion worth of U.S. beef a year. This trade stopped in 2003 when Japan imposed trade bans and restrictions following the discovery of bovine spongiform encephalopathy (BSE) in the United States. U.S. beef regained access to the Japanese market in 2005, and exports have been growing since then. In 2009, Japan imported $470 million of U.S. beef, making it the second largest export market in value for U.S. beef.

The United States produces large amounts of specific meat cuts and offal that bring higher returns in Japan than in domestic markets. Japanese beef prices rose significantly following the 2003 trade restrictions, which severely limited supplies of these cuts. An increased presence of U.S. beef in Japan could bring higher returns for

Lower prices have the most potential to increase beef consumption in Japan



Source: USDA, Economic Research Service.

U.S. producers and lower prices for Japanese consumers. However, Japan continues to ban U.S. beef from cattle over 20 months old and requires mandatory age verification, limiting supplies that could reduce prices in Japan.

Rising consumption is the key to continued growth in the Japanese beef market. Prices, income, and demographics will determine the potential size of Japan's beef market. Japan's declining population means that total consumption would fall even if consumption per person remained constant. Only modest income gains are expected in Japan over the next decade, but price changes could influence future consumption. Japanese consumers appear to be sensitive to changes in price when making purchasing decisions for beef. ERS estimates that a decrease of 1 percent in beef prices will lead to increases in consumption greater than 1 percent.

ERS researchers analyzed multiple consumption scenarios for Japan using USDA's 10-year projections for income and population and estimates of Japanese consumers' response to changing economic conditions. In case 1, where prices and incomes do not change, consumption declines because the population declines. Case 2 shows that even modest income gains could help offset some of the effects of the population decline. Case 3 demonstrates much larger changes to consumption if prices decrease, here set at 2 percent per year.

The analysis shows that there is potential for the Japanese beef market to continue growing, particularly if prices decrease. Improved access to imported beef could trigger such decreases and lead to higher consumption. This would be good news for U.S. producers, as much of this increased demand would likely be captured by U.S. beef.

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This finding is drawn from . . .

Japan's Beef Market, by Kakuyu Obara, Michael McConnell, and John Dyck, LDP-M-194-01, USDA, Economic Research Service, August 2010, available at: www.ers.usda.gov/publications/ldp/2010/08aug/ldpm19401/

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Few Farms Participate in the Vegetable Planting Pilot Program

The 2008 Farm Act's Planting Transferability Pilot Program (PTPP) allows program crop producers who participate in Federal commodity programs in seven Upper Midwestern States to plant selected vegetables destined for processing without violating Government payment contracts. Under the traditional rules of commodity programs, planting fruit and vegetables on base acres (acres planted to program crops) is restricted. Program rules did allow farmers to expand fruit and vegetable acreage on nonbase acres without forgoing Direct and Countercylical Payments (DCP) or Average Crop Revenue Election (ACRE) payments.

The PTPP permits the planting of certain vegetables for processing on base acres in Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin, regardless of previous fruit and vegetable

planting history. The pilot program places farms with no history on the same footing as those with a planting history—program payments are reduced acre-for-acre for each vegetable acre planted.

Program participation, however, has been low, with a total of 155 farms participating. Illinois, Indiana, and Minnesota accounted for approximately 85 percent of the farms and acres. Using farm-level data from USDA's Farm Service Agency, ERS researchers estimated that 10,000 acres were planted under PTPP in 2009—about 14 percent of the total allowable acres by statute and 2 percent of total processing vegetable acreage in the seven States. About 50 percent of PTPP acres were planted to sweet corn and green peas, which represents just 1 percent of U.S acreage for these processing vegetables. Farms with no history of planting fruit and vegetables made up the bulk of those participating in the PTPP.

The PTPP was authorized in response to claims by Midwestern vegetable processors that the traditional farm program planting rules constrained availability of raw vegetables for processing. The PTPP allows growers to plant cucumbers, green peas, lima beans, pumpkins, snap beans, sweet corn, and tomatoes. Eligible PTPP acreage is capped at various levels across States but cannot exceed a total of 75,000 acres.

One reason for the relatively low PTPP participation is stagnant or declining long-run demand for processing vegetables. Net returns to other crops are often more attractive to growers. Moreover, should market conditions become more favorable, additional demand can largely be met by planting on nonbase acres and base acres on farms with a prior vegetable planting history.

Planting Transferability Pilot Program (PTPP) expanded planting options

	Before PTPP		After PTPP	
Commodity program history	Planting on nonbase acres[1]	Planting on base acres	Planting on nonbase acres	Reduced base acres
With fruit and vegetable history	No loss of payment	Acre-for-acre payment loss	No loss of payment	Acre-for-acre payment loss
Without fruit and vegetable history		Minimum of acre-for-acre payment loss plus market value of vegetables; or entire DCP[2]		

[1]Base acres are defined as the amount of a farm's acreage eligible for commodity program payments.
[2]DCP=Direct and Countercyclical Payment.

Source: USDA, Economic Research Service.

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This finding is drawn from . . .

Fruit and Vegetable Planting Restrictions: Analyzing the Processed Cucumber Market, by Barry Krissoff, Mesbah Motamed, Edwin Young, and Chengxia You, VGS-342-02, USDA, Economic Research Service, February 2011, available at: www.ers.usda.gov/publications/vgs/2011/02feb/vgs34202/

FINDINGS


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Choosing Healthy Foods Is More Challenging for Teens

Childhood obesity is a public concern, and consumption of caloric sweetened beverages, the frequency of eating fast food, and an array of unhealthy options at schools have been named as possible culprits. Unfortunately, identifying effective obesity-fighting policies is difficult because, for many children, poor food choices are simply the norm, both at and away from home.

ERS researchers used 2 days of children's dietary intake data from two national food intake surveys to estimate how the number of meals or snacks eaten away from home and at school affect the total number of calories consumed and other measures of daily diet quality. Each meal or snack was classified as food from home, food acquired away from home, or food from school. The designation was based on the source for the majority of calories in each meal or snack, after excluding beverages. For example, a home-packed bag lunch eaten with a bag of chips from school would be classified as an at-home meal.

Among children ages 6-12, food away from home and food from school did not significantly affect daily caloric intake compared with at-home snacks or meals. Among children ages 13-18, however, eating food away from home added 108 calories to total daily intake compared with eating at home; eating food from school added 145 calories. Food from school included USDA-reimbursable school meals and all other foods purchased at school (other than beverages). The similar caloric increase from food away from home and foods from school for 13-18 year olds likely reflects an increased availability of many types of foods in middle and high schools, including a la carte side dishes and desserts. In comparison, elementary schools tend to offer more limited choices.

A closer look at the relationship between changes in daily calories and changes in daily intake of caloric sweetened beverages showed that these beverages significantly increased calories consumed by both younger and older children. But the size of the increase differed by age. This difference may be driven by an underlying variation in the types of caloric sweetened beverages consumed, which included nondairy beverages such as fruit or fruit-flavored drinks, soda, energy drinks, and flavored water. Differences in the way that older and younger children compensate food calories for caloric sweetened beverage calories could also have an effect.

Among 6-12 year olds, 1 ounce of caloric sweetened beverages added 11.6 calories—meaning that a 12-ounce can would boost total daily intake by 139 calories. Among 13-18 year olds, 1 ounce added 10.3 calories, meaning a 12-ounce can would add 123 calories to daily intake. And while each ounce of caloric sweetened beverage had slightly less of an effect on older children's daily caloric intake, older children drank almost twice as much as younger children did—24 ounces per day, on average, compared with 14 ounces per day.

Improving diet quality is an important goal at any age. Increased knowledge about the impact of beverage choices and food sources on overall caloric intake may enable children and teens to take steps to reduce obesity. The ERS study results suggest that teenagers could especially benefit from paying careful attention to their food and beverage choices when eating away from home.

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This finding is drawn from . . .

How Food Away From Home Affects Children's Diet Quality, by Lisa Mancino, Jessica E. Todd, Joanne Guthrie, and Biing-Hwan Lin, ERR-104, USDA, Economic Research Service, October 2010, available at: www.ers.usda.gov/publications/err104/

Americans Can Satisfy Dietary Guidelines for Vegetables and Fruit for Under $2.50 Per Day

Hayden Stewart, USDA/ERS

Federal dietary guidance advises Americans to increase their consumption of vegetables and fruit to meet recommended quantities and variety. Food prices, along with taste, convenience, income, and awareness of the link between diet and health, shape food choices. How much does it cost to meet the recommendations for vegetables and fruit?

The 2010 *Dietary Guidelines for Americans* advises individuals needing 2,000 calories per day to consume 2 cup equivalents of fruit and 2.5 cup equivalents of vegetables daily. ERS researchers used 2008 Nielsen Homescan data to estimate retail prices for 59 fresh and processed fruit and 94 fresh and processed vegetables averaged across package sizes, brand names, and types of stores. Average prices were adjusted for the removal of inedible parts and losses from cooking. When they applied these adjusted average prices, the ERS researchers found that, in 2008, Americans on a 2,000-calorie diet could purchase the quantity and variety of both fruit and vegetables recommended in the *2010 Dietary Guidelines for Americans* for between $2.00 and $2.50 per day, or roughly 50 cents per edible cup equivalent.

Prices per edible cup equivalent varied widely between different types of fruit and vegetables. Fresh watermelon, at 17 cents per edible cup equivalent, sold for the lowest average price among the fruit, while fresh raspberries, at $2.06, were priciest. A similar range of prices existed among the vegetables.

Processed fruit and vegetables were not consistently more or less expensive than fresh. Canned carrots (34 cents per edible cup equivalent) were more expensive to consume than whole fresh carrots (25 cents). However, canned peaches (58 cents) were less expensive than fresh (66 cents).

The ERS researchers found that fruit and vegetables priced similarly at retail stores often varied substantially when priced in edible equivalents. For example, fresh broccoli florets and fresh ears of sweet corn both sold for around $1.80 per pound at retail in 2008. However, the average price of sweet corn after boiling and disposing of the cob was $1.17 per edible cup equivalent, compared with 63 cents for cooked broccoli florets.

Price differences reflect a variety of factors, such as prices at the farm gate, processing and other marketing costs, and losses from cooking and inedible parts.

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How much does an edible cup equivalent cost?

Fruit	Dollars per cup equivalent	Vegetables	Dollars per cup equivalent
Bananas	0.21	Potatoes–boiled from fresh	0.19
Apples	0.28	Spinach–boiled from frozen	0.96
Applesauce	0.46	Corn, sweet–canned, whole kernel	0.37
Oranges, navel	0.34	Pinto beans–canned	0.38
Orange juice–frozen concentrate	0.26	Carrots, whole	0.25
Raisins	0.39	Tomatoes, grape and cherry	1.20
Pineapple–canned	0.49	Tomatoes–canned	0.41
Strawberries	0.89	Iceberg lettuce, head	0.26

Source: USDA, Economic Research Service analysis of 2008 Nielsen Homescan data.

This finding is drawn from . . .

How Much Do Fruits and Vegetables Cost? by Hayden Stewart, Jeffrey Hyman, Jean Buzby, Elizabeth Frazão, and Andrea Carlson, EIB-71, USDA, Economic Research Service, February 2011, available at: www.ers.usda.gov/publications/eib71/

You may also be interested in . . .

ERS Data on Fruit and Vegetable Costs, available at: www.ers.usda.gov/data/fruitvegetablecosts/

Lynn Betts, USDA/NRCS

Farmers Develop Strategies To Reduce Energy Input Costs

Between 2002 and 2008, fuel and fertilizer prices rose sharply, thereby contributing to substantially higher total farm energy-intensive input costs. During this time, inflation-adjusted annual average prices paid by farmers for fuel (including diesel, gasoline/gasohol, and liquefied petroleum) rose by 182 percent, and annual average prices paid by farmers for mixed fertilizers (nitrogen, phosphate, and potash) increased by 202 percent. Across all farms, fertilizer and fuel costs averaged 12 percent of production expenses. For corn, soybean, wheat, and cotton farms, however, fertilizer and fuel costs averaged more than 20 percent of total expenses. Consequently, steep increases in energy-related costs have had a greater impact on farms producing these four crops.

The escalation in energy prices prompted farmers to develop energy-saving strategies and to adopt practices to use energy-intensive inputs more efficiently. USDA's 2006 Agricultural Resource Management Survey asked farmers about their use of energy-saving strategies. According to the results of the survey, about a fourth of all U.S. farms reduced energy use or employed energy-intensive inputs more efficiently.

Commercial farms were more likely to initiate steps to reduce energy-related costs. Farms that developed energy-saving strategies tended to have higher per acre fertilizer, fuel, and other energy-related input expenses, and their operators were younger and more educated than operators of farms that did not take steps to reduce energy costs. Practices adopted to reduce fertilizer expenses, in declining order of frequency of use, included reducing the quantity of input, conducting soil tests, employing precision technologies (for fertilizer, pesticide, and seed applications), and negotiating price discounts. More than half of farmers who negotiated discounts were able to reduce fertilizer prices by at least 5 percent.

The most common practices used to lower fuel expenses were keeping engines properly serviced, making fewer trips over a field, and reducing the quantity of fuel used. About 40 percent of farmers who negotiated fuel price discounts were able to reduce fuel prices by at least 5 percent.

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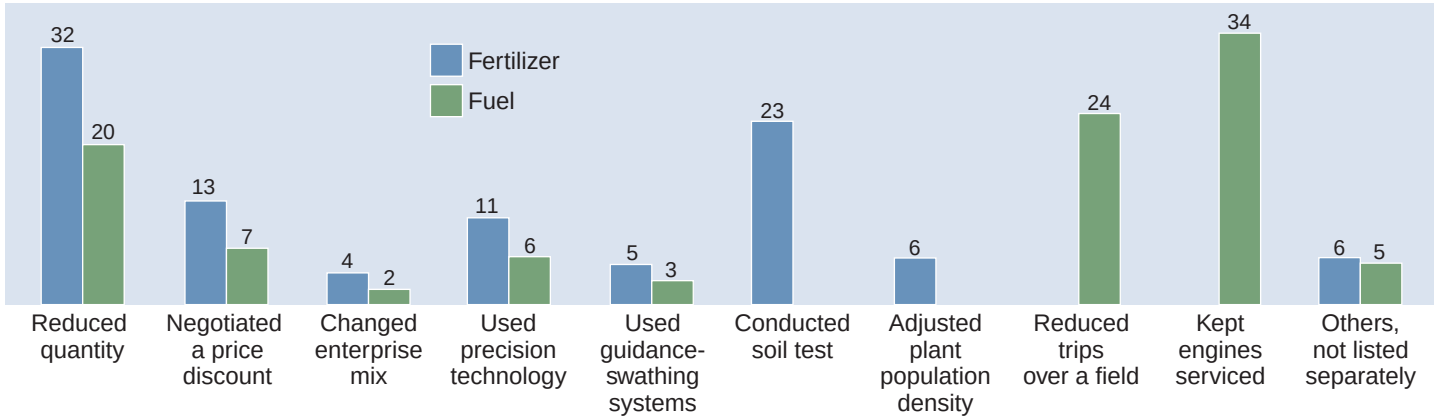
This finding is drawn from . . .

Agricultural Income and Finance Outlook, AIS-86, USDA, Economic Research Service, December 2008, available at: http://usda.mannlib.cornell, edu/usda/ers/AIS//2000s/2008/AIS-12-10-2008.pdf

Farmers used a variety of practices to reduce fertilizer and fuel costs in 2006

Percent of farms



Source: USDA, Economic Research Service using data from USDA's 2006 Agricultural Resource Management Survey.

Contracting Expands for Field Crops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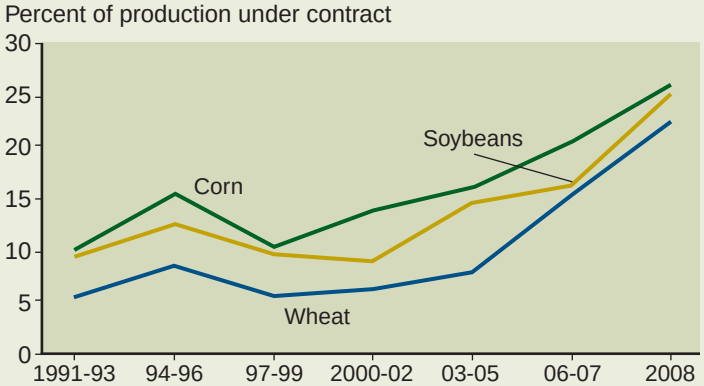
Most U.S. corn, soybean, and wheat production is sold through cash markets, where the producer receives the market price prevailing at the time of sale. However, marketing contracts, which set a market outlet and a pricing arrangement for crops before they are harvested, are becoming increasingly important as risk management tools. Marketing contracts covered 15 percent of corn production in 2001, along with 9 percent of soybean and 6 percent of wheat production. By 2008, contracts covered 26 percent of corn, 25 percent of soybean, and 23 percent of wheat production.

Marketing contracts are particularly important for special higher cost varieties of a commodity, such as high-oil corn or organic soybeans, by providing assurance of a buyer and an acceptable price premium early in the production process. But marketing contracts may also be desirable for some of a farmer's conventional production as an assured outlet and price provide effective risk management.

Contracting farms differ from farms that do not use contracts:

- They are larger—with more acres planted to the specific crop (contracting corn farms harvested 386 acres of corn, on average, compared with 194 acres for noncontracting corn farms) and with greater sales from other commodities as well.
- Crop farmers with contracts use them widely—for example, farms that had any soybean production under contract also put nearly 40 percent of their nonsoybean production under contract, while soybean farms that do not use contracts for soybeans placed only 5 percent of their other production under contract.
- They use other risk management tools as well—relying more on futures and options contracts to hedge risks; they are more likely to invest in onfarm storage, which allows them to better time crop sales; and they are more likely to participate in farmer-owned cooperatives, which may pursue risk management strategies on members' behalf.

More corn, soybeans, and wheat are marketed under contract



Source USDA, Economic Research Service using data from USDA's Farm Costs and Returns Survey (1991-1995) and USDA's Agricultural Resource Management Survey (1996-2008).

Why is more field crop production coming under contract? Looking at corn alone, ethanol production might be considered the main driver of the contracting trend, since ethanol producers buy much of their corn under contract. These firms, however, usually contract with elevators, not with farmers, and the shifts in corn are mirrored by changes in soybeans and wheat.

Price risks play an important role in the expansion of contracting. Prices for all three commodities are high and variable. With greater price risks, more farmers of all sizes are turning to marketing contracts and other risk management tools. But increased price risks can only explain part of the shift to contracts, since contracting for these crops has been expanding since 2001. The continuing shift of production to larger farms likely plays a role because larger farms are far more likely to use contracts and other risk management tools.

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This finding is drawn from . . .

Agricultural Contracting Update, Contracts in 2008, by James M. MacDonald and Penni Korb, EIB-72, USDA, Economic Research Service, February 2011, available at: www.ers.usda.gov/publications/eib72/

Will Calorie Labeling in Restaurants Make a Difference?

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- ERS research shows that away-from-home meals and snacks tend to contain more calories and to be of lower nutritional quality than food prepared at home.
- Recent legislation will require chain restaurants across the United States to list calorie information on their menus and menu boards.
- Calorie disclosure may prompt consumers to substitute menu items that lower their caloric intakes and may encourage restaurants to offer lower calorie options.

Where dining out was once reserved for special occasions, it is now part of many Americans' weekly, or even daily, routine. From grabbing a breakfast sandwich on the way to work to meeting friends for dinner, Americans are consuming a large portion of their meals—and calories—from foods prepared outside the home. According to ERS estimates, food away from home accounted for 42 percent of U.S. households' food expenditures in 2009.

Many Americans make less nutritionally sound food choices when eating out than when eating food prepared at home. One reason for the poorer nutritional quality of our restaurant choices may be lack of information. When shopping at grocery stores, consumers can compare packaged food items by their nutrient content, such as calories, saturated fat, and sodium. When dining out, such comparisons can be difficult. Unlike for packaged foods in the grocery store, national nutrition labeling is not mandatory for foods served in restaurants.

But that is about to change. The Patient Protection and Affordable Care Act of 2010 will require chain restaurants to post the number of calories in each standard menu item. Some restaurants already voluntarily provide calorie counts or other nutritional information, and some States and local governments have made such labeling mandatory. The 2010 Act, however, authorized the U.S. Food and Drug Administration (FDA) to establish uniform requirements affecting many U.S. chain restaurants.


eggs benedict
florentine
toast or croissant
jam
breakfast delights
croissant
beans on toast
fruit toast
extras
flaked salmon
organic puy lentil
asparagus & roast
moroccan chick
open lamb burg

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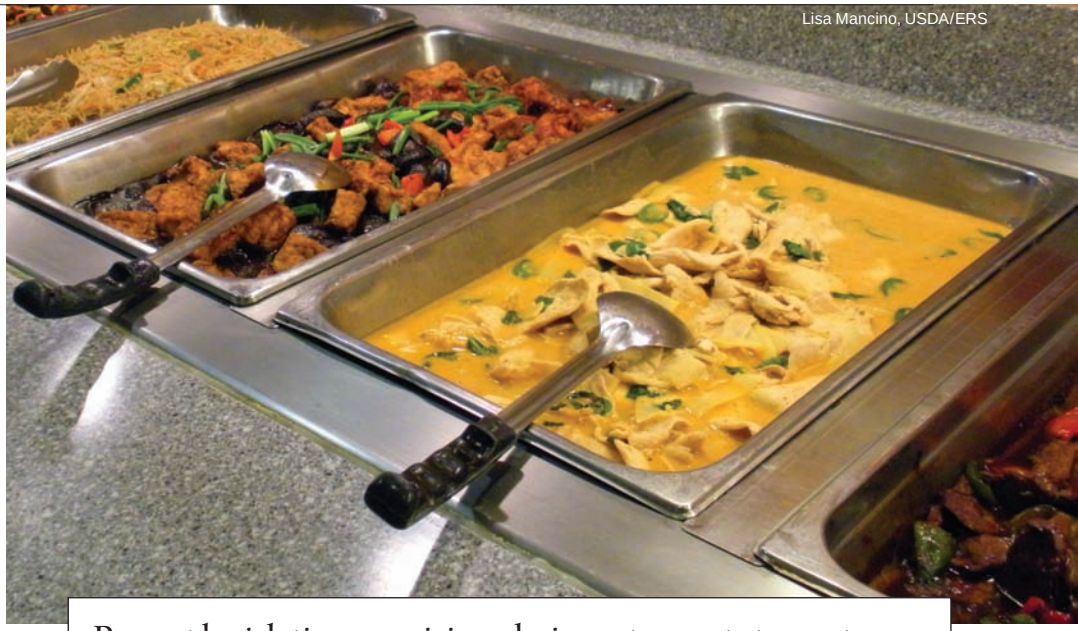

Lisa Mancino, USDA/ERS

Recent legislation requiring chain restaurants to post calorie information also covers self-service foods, such as buffet items, salad bars, and self-serve beverages.

Health professionals hope information on the nutritional content of specific foods and dishes will help consumers choose healthier, more nutritious diets. Will such information affect consumers' purchase decisions and consumption patterns? ERS studies on the dietary effects of food away from home and nutritional information give clues about likely answers.

More Eating Out Means Lower Diet Quality

ERS analyses of Federal food intake surveys reveal that in 2003-06, Americans obtained 33 percent of their daily calories from away-from-home foods, up from 18 percent in 1977-78. Nearly half of surveyed adults dined out three or more times a week in 2005-06, and 12 percent reported eating away from home more than seven times per week.

As away-from-home eating becomes more frequent, its dietary impact increases as well. When dining out, Americans consume more calories per eating occasion, as well as higher amounts of total fat, saturated fat, and cholesterol and lower amounts of dietary fiber, calcium, and iron on a per calorie basis, than when eating food prepared at home. Even after controlling for individual differences in dietary awareness and food preferences, a 2010 ERS analysis shows that each additional away-from-home meal increased average daily calorie intake of adults by 134 calories, which could result in roughly 2 pounds in weight gain over 1 year, if other things such as physical activity remain the same.

The results of several studies reveal that people generally underestimate the calories and fat content in restaurant menu items. The disparity between estimated and actual calories is larger for high-calorie foods and, ironically, for foods ordered from establishments that promote their menu items as healthy.

ERS researchers also looked at the diets of children 6- to 18-years old and found that food away from home has an effect on this age group's diet quality as well. Compared with a snack or meal eaten at home, each away-from-home snack or meal added roughly 65 calories to the average daily intake of a 6- to 18-year old. Among teenagers, the effect was more pronounced—eating a meal away from home added 108 more daily

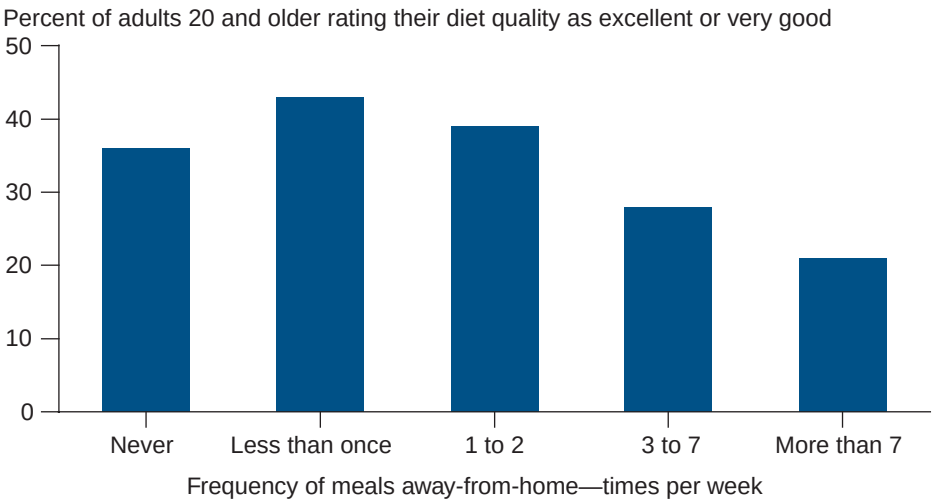
In 2003-06, Americans age 2 and older consumed one-third of their calories away from home

Source	1977-78	1989-91	1994-96	2003-06
	Percent of daily calories			
Away-from-home foods	18	27	32	33
Fast food places	3	8	11	14
Restaurants	3	6	8	7
Schools	3	2	2	3
Other	9	10	11	8

Notes: "Fast food places" are restaurants with counter service (no wait staff) and cafeterias. "Schools" include school- and day care-provided meals and all other foods and beverages purchased at schools. "Other" includes sports stadiums, movie theaters, bars, and other away-from-home sources. Categories may not equal totals due to rounding.

Source: USDA, Economic Research Service using data from Nationwide Food Consumption Survey 1977-78; Continuing Survey of Food Intakes of Individuals, 1989-91 and 1994-96; and National Health and Nutrition Examination Survey 2003-06 (day 1 data).

Fewer consumers rated their diets as "excellent" or "very good" as frequency of away-from-home meals increased



Source: USDA, Economic Research Service using data from 2005-06 National Health and Nutrition Examination Survey.

calories than eating at home. At the same time, eating away from home increased the quantity per calorie of other components consumed in excess—saturated fat, sodium, added sugars, and solid fat (see "Choosing Healthy Foods Is More Challenging for Teens" on page 6 of this issue).

Consumers appear to recognize that frequent eating away from home can lower diet quality. In an ERS analysis of the 2005-06 National Health and Nutrition Examination Survey (NHANES) data, only 21 percent of respondents who ate more than seven away-from home meals per week rated their overall diet quality as excellent or very good, compared with 43 percent who ate out less than once per week. While people may generally recognize that eating out frequently can lower diet quality, they may have difficulty correcting the situation if they lack specific details about calories and nutrients.

New Rules Will Require Chains To Post Calorie Content

If a lack of specific information contributes to excess caloric consumption, then labeling in the away-from-home market may make it easier to moderate intake. Calorie labeling may help diners make healthier choices when eating out, or it may help them realize that they should consume fewer calories at other meals throughout the day to compensate for high-calorie meals away from home.

The 2010 Act requires chain restaurants to post calorie information on menus and menu boards next to the listing for each standard menu item. The 2010 Act defines chain restaurants as those with 20 or more locations doing business under the same name and offering for sale substantially the same menu items. Menu and menu boards also must include a statement about suggested total daily caloric intake to provide context for consumers. The menu and menu board must include a statement that additional nutritional information, such as saturated fat, carbohydrate, and sodium content, is available upon request. Such information must be available in written form and include most of the nutrition information currently provided on packaged food labels.

Self-service food, such as buffet items, salad bars, and self-serve beverages, sold in chain restaurants also must have a sign that lists calories per displayed food item or per serving. Daily specials, temporary menu items appearing on the menu for less than 60 days, custom orders, and items being test marketed for less than 90 days are exempt.

The 2010 Act requires FDA to issue proposed regulations to carry out the new requirements no later than March 23, 2011. The calorie-posting requirements will affect only chain establishments, but these restaurants represent a sizeable share of the food-away-from-home market. According to ERS analysis of 2003-04 restaurant sales data, 55 percent of all food-away-from-home visits are at major chains.

How these proposed changes in menu labeling will ultimately affect food choices is still unknown, but evaluations of labeling requirements on packaged foods and studies of menu labeling in localities such as New York City offer some clues.

Past Experience With the "Nutrition Facts" Label

The disclosure of nutritional information on most packaged foods sold in U.S. grocery stores became mandatory with the implementation of the 1990 Nutrition Labeling and Education Act (NLEA) in 1994. Under the NLEA, nearly all packaged foods are required to carry the "Nutrition Facts" label, which lists per serving amounts and percentages of daily values for a variety of nutrients in a standardized format. By providing nutrition information in a cred-

ible, distinctive, and easy-to-read format, the label was expected to help consumers choose healthier, more nutritious diets.

Findings from empirical studies show that the NLEA led consumers to acquire more information about nutrition. An ERS review of the NLEA's impact revealed that packaged food labels triggered greater consumer awareness of nutritional issues. Using data gathered 8 months before and 8 months after NLEA's implementation, a Duke University researcher found that the new labels helped consumers acquire and comprehend more nutrition information. Results from another study, which used a similar pre- and post-NLEA design, showed that the NLEA increased consumer attention to potentially negative nutritional attributes, such as high fat and sodium content.

Awareness, however, did not consistently translate into action, and its effect on food choices varied by nutrient. A 2008 ERS analysis found that people who reported using the Nutrition Facts label had higher fiber and iron intake than those who rarely or never used the information. At the same time, ERS researchers found no evidence that label use was associated with reduced intake of calories, saturated fat, or cholesterol.

Consumers May Be Less Attentive to Nutrition Labeling When Eating Out

Consumers may respond differently to nutrition labeling in restaurants than to labels in grocery stores. On the one hand, consumers may be more likely to pay attention to restaurant labeling because it provides the calorie content for an entire dish versus the individual ingredients for a home-prepared meal. On the other hand, restaurant patrons may be looking for a quick lunch, a simple solution to tonight's dinner dilemma, or a way to celebrate a special occasion. In these instances, nutrition content or calorie modification may not be a priority.

ERS researchers found that people's knowledge about health and nutrition issues has less impact on the diet quality of their food choices when they eat away from home. They also found that even dieters choose less healthy options when eating out than when eating at home. These findings suggest that diners may pay less attention to nutritional information when eating out than when shopping for the week's meals.

According to one study of food choices in fast food restaurants, New York City's calorie labeling law did not appear to have an effect on the quantity of calories consumers purchased. The law, which took effect on July 19, 2008, requires restaurants with at least 15 outlets to post calorie counts for all regular menu items. New York University (NYU) researchers collected receipts and survey responses from 821 adults at fast food restaurants in low-income, minority neighborhoods in New York City (for a complete list of references, see www.ers.usda.gov/amberwaves/march11/features/calorielabeling.htm). Their purchases were compared with those of 335 adults in Newark, NJ—a city with similar urban and demographic characteristics, but no menu labeling. Data were collected just before and 1 month after labeling was introduced in New York City.

The NYU researchers found that 27.7 percent of New York City customers who saw the calorie labeling indicated that the information influenced their choices, and about 88 percent of these customers said they purchased fewer calories in response to the labeling. Their receipts showed otherwise, however. Survey participants in New York City purchased about the same number of calories both before and after

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Calorie labeling in restaurants may have little impact on the food choices of consumers motivated by convenience alone.

the labeling law took effect—and about the same amount as the Newark participants.

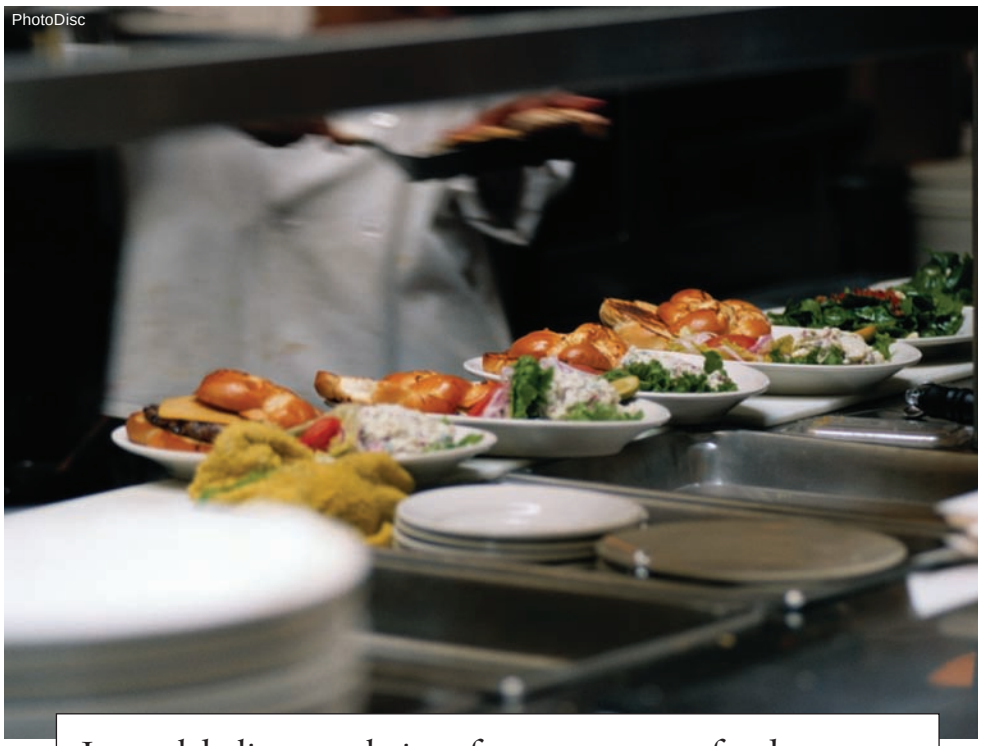
Findings from a Stanford University study show different results. Researchers compared Starbucks sales in New York City (pre- and post-mandatory calorie labeling) with sales in Boston and Philadelphia, where there were no calorie postings. The researchers found that mandatory calorie posting caused average calories to fall by 6 percent—from 247 to 232 calories per transaction. Almost all of the effect was related to food purchases; there was almost no change in purchases of beverage calories.

Restaurants Also May Reformulate Their Fare

Changing food choices is not the only way to shift aggregate consumption patterns and nutrient intake. In an effort to compete for health-conscious customers, manufacturers often introduce new products or reformulate existing ones to capitalize on the latest health concerns. Such changes can offer secondary benefits; even consumers not looking for better nutrition may reap dietary benefits from healthier versions of their favorite foods and beverages. Calcium-fortified juices and breads are examples of such product reformulations.

Changes in trans fat content are another example. The FDA issued a final regulation for mandatory trans fat labeling in 2003, which went into effect on January 1, 2006. Manufacturers reacted to media attention and mandatory trans fat labeling by reformulating many of their products. The number of new products stating "no trans fats" on the label increased from 64 in 2003 to 733 in 2007, then fell to 642 in 2008.

Similarly, ERS researchers found that manufacturers were quick to respond to the recommendation in the 2005 *Dietary Guidelines for Americans* that at least half of a person's daily grain intake come from whole grains. The researchers noted that the average number of new whole-grain products jumped from 4 per month in 2001 to 16 in 2006.


PhotoDisc

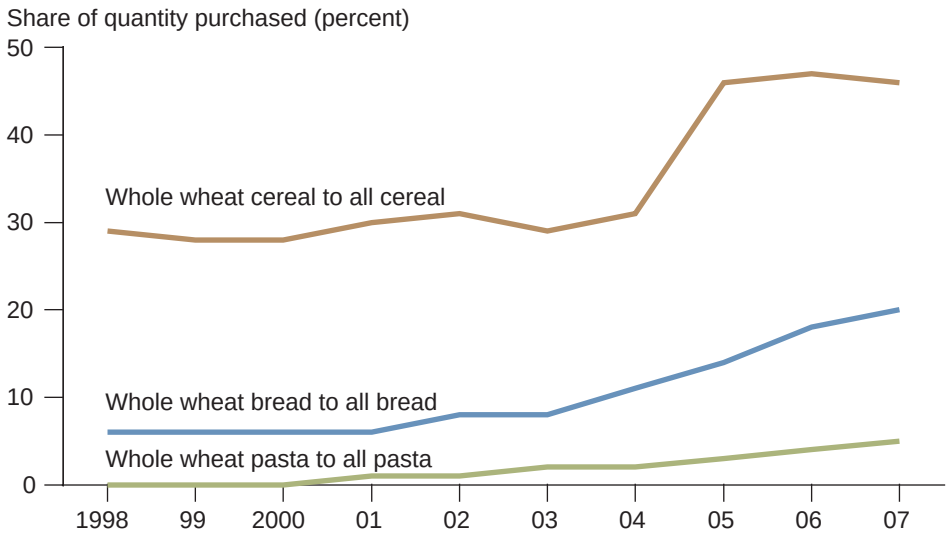
Just as labeling regulations for grocery store foods encouraged product reformulations, calorie labeling may spur restaurants to lighten their recipes.

For whole-grain products, these reformulations have translated into increased sales of healthier foods. Using Nielsen Homescan data, ERS researchers found that in 2001, whole grain products accounted for 11.1 percent of all pounds of packaged grain products purchased in grocery stores (excluding flours, mixes, and frozen or ready-to-cook products). By 2006, whole grains' share of total grain product purchases was 17.9 percent. ERS researchers found whole-grain breads accounted for 6 percent of all pounds of bread purchases in 2001 and rose to 20 percent by 2007. Over this same time period, whole-grain cereals jumped from 30 percent of all cereals purchased to 46 percent.

As with processed food labeling under NLEA, public health advocates hope that calorie labeling will encourage restaurants to reformulate many of their high-calorie items to offer lighter, healthier options. The question is, will customers buy the lower calorie entrees and side dishes? Some observers are dubious, since past attempts to offer healthier menu items have not always been successful, especially when reformulating ingredients that influence taste perceptions.

An ERS review of existing research shows reasons to be cautious. In a University of Sussex, UK, experiment, low-fat labels on soups weakened participants' expectations about taste. Soups with the same fat

Sales of whole grain products rose following advice to increase their share of daily grain consumption



Source: USDA, Economic Research Service analysis using Nielsen Homescan data.

content were labeled low fat or high fat. Participants rated the "high-fat" soups as tasting more pleasant and creamier than those labeled "low fat." In an experiment conducted by the British Institute of Food Research in a restaurant setting, fewer patrons chose the dishes labeled as "low fat."

Such consumer response could limit the market for lighter options in restaurants. Examining the post-NLEA market for salty snacks, ERS researchers observed that food manufacturers introduced 1,914 new reduced/low-fat products in 1995 and 2,076 in 1996. The market for these products, however, never grew as anticipated. As a result, food processors dramatically cut their introductions of lower fat products after 1996, introducing only 481 in 1999.

How You Say It—and Where—May Be as Important as What You Say

Consumer response to labeling may depend on how, when, and where the information is presented. For example, behavioral economics studies show that how information is framed can have a major impact on its effect. Simply reading the calorie count of an individual menu item may have little meaning to individuals who are unaware of their own total daily caloric requirement. Unlike the New York City labeling law, the 2010 Act stipulates that menu and menu boards must include a statement about suggested total daily caloric intake.

In an ERS-funded study, researchers at Carnegie Mellon University conducted a series of experiments where customers entering a sandwich shop were offered a free meal (sandwich, side, and drink) in exchange for completing a survey. Survey participants were randomly given one of three 1-page "featured subs" menus—one listing the five lowest calorie sandwiches, one listing the five highest calorie sandwiches, or one with a mix of high- and low-calorie options. The bottom of the page included the statement: "Additional subs are available in the pamphlet at the back of this binder." Additionally, some of the three menu types listed the calories of each item, and some also included daily calorie recommendations.

The researchers found that providing calorie information did not encourage participants to select a low-calorie sandwich but did lower total meal calories by about 50 calories. On the other hand, confining the featured subs to the low-calorie options strongly influenced sandwich choice. Participants who received the menu with only low-calorie sandwiches were 48 percent more likely to choose a low-calorie sandwich than participants given the mixed menu.

In a later experiment, the researchers gave participants the same three featured sub menus but offered additional sandwich choices either contained in a sealed menu or on the next menu page. The researchers found that if they had to open the sealed menu to get to the higher calorie options, diners chose lower calorie sandwiches and reduced total calorie intake. In contrast, requiring customers to turn the page for additional options led them to choose lower calorie sandwiches, but they compensated by ordering higher calorie side dishes and drinks.

These two experiments suggest that calorie information and the prominence given to lower calorie options can affect away-from-home food decisions. The

The likelihood that a particular menu item is chosen depends on a variety of factors, including the calorie content of other menu options.

chance that a certain menu option is chosen may also depend on the caloric content of other menu options available. A diner's perception of a double cheeseburger versus a low-fat veggie burger may change after reading the nutrient content of a quadruple bacon cheeseburger on that same menu. Including a super high-calorie option on the menu may reframe the relative healthfulness of the other choices—in this case, the double cheeseburger is now a comparatively moderate choice.

The names given to lower calorie, healthier menu items also can affect the likelihood that they are chosen. For example, making the lighter version of an entrée, side, or salad the new norm and renaming the original versions to reflect their higher fat or calorie content may be more effective at getting customers to choose the healthier options than simply presenting them as such.

The mixed results of these and other small-scale menu labeling studies suggest it is still too early to tell how restaurant calorie labeling will affect caloric intake. To fully gauge its impact, it will be important to monitor consumer food choices and restaurants' menu options over a longer period of time. It is possible that diners, while making no change in their food purchases at a particular eating occasion, may opt to compensate by eating fewer calories at other meals. Consumers also may reduce the frequency of visits to restaurants with few low-calorie options.

This article is drawn from . . .

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Income Growth in Developing Countries Can Increase U.S. Agricultural Exports

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- Developing and middle-income countries are becoming increasingly important export markets for high-value agricultural products due to population, urbanization, and income growth.
- The U.S. agricultural export sector is well placed to meet the increasing demand for high-value food products, such as meat, dairy products, and prepared foods.
- In many developing countries, agricultural productivity growth is the strongest driver of income growth.

Income growth has increased food imports by developing countries, particularly since higher incomes strengthen the demand not only for traditional food but also for a more diversified diet. As a greater proportion of the world's population seeks to expand the quality and quantity of foods consumed, U.S. agricultural exports—such as feed and fodder and high-value foods—will continue to increase.

According to USDA long-term projections, developing countries will be the main source of projected growth in global food demand and trade. Food consumption in developing countries is considerably more responsive to income growth than in developed countries. Nearly 40 cents of an additional dollar of income will go to food in developing countries, compared with 10 cents in developed countries.

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Developing Countries Are Important Markets for U.S. Agriculture

Strong income growth and rising populations in developing countries have increased demand for high-value food products, such as meats, dairy products, and a greater variety of fruit and vegetables, as well as a broad range of prepared foods. Growing urbanization also contributes to dietary changes. City dwellers are exposed to new food varieties, and their lifestyles often lead to less cooking and increased purchases of prepared foods.

Developing countries now account for more than half of all U.S. agricultural exports. Mexico and China are two major markets for U.S. agricultural exports, and countries such as India, Indonesia, and Colombia are becoming important export destinations. Among the large number of developing-country trading partners, 16 low- and middle-income countries account for 37 percent of U.S. agricultural exports, up from 15 percent in 1990. Since 1990, the average growth of U.S. exports to these countries has exceeded 10 percent annually.

While low- and middle-income countries are becoming increasingly important export markets for the U.S. agricultural sector, high-income markets are moving in the opposite direction. Nine high-income countries, most prominently Canada and Japan, accounted for 55 percent of U.S agricultural exports in 1990, but their share fell to 43 percent by 2008. Average annual growth in U.S. exports to these high-income countries was just 2.4 percent during that period.

Most high-income countries are reaching a point of food demand satiation. Average per capita consumption in high-income countries is close to 3,400 calories per day. The volume of food consumed is unlikely to increase considerably, and changes in diet composition will be marginal. Between 1990 and 2005, consumption patterns changed little in high-income countries. The share of staple foods, such as cereals and roots and tubers, remained at 29 percent of the average diet, and vegetable oils accounted for about 12 percent.

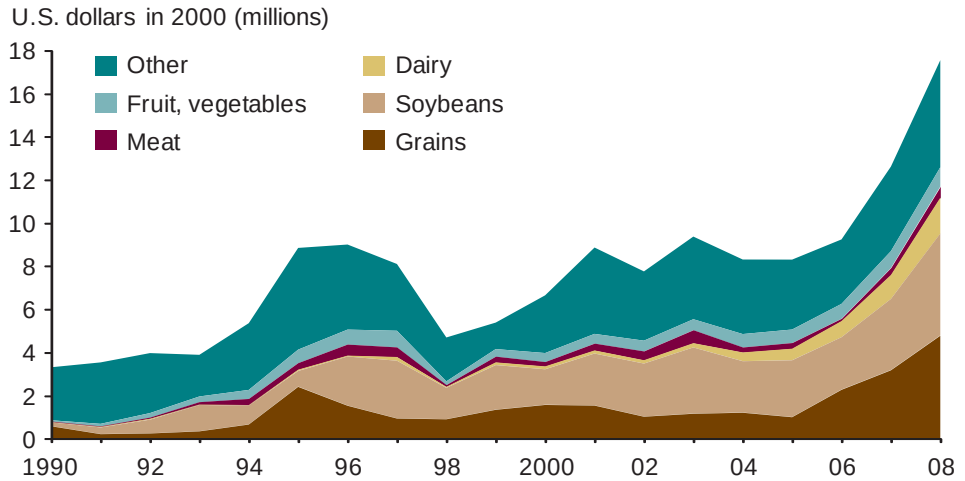
Developing countries now account for more than half of all U.S. agricultural exports.

Consumption Patterns Changing in Developing and Middle-Income Countries

Staple foods averaged 60 percent of total food consumption in low-income countries and 42 percent in middle-income countries in 2005; however, those shares are declining. ERS researchers found that all countries are moving toward similar, more varied diets characterized by fewer staples and more meat, dairy, vegetable oils, and fruit and vegetable products (see "Converging Patterns in Global Food Consumption and Food Delivery Systems" in the February 2008 issue of *Amber Waves*).

Many low- and middle-income countries are not able to meet increased demand through domestic production and rely instead on the world market. For instance, as incomes have risen, demand for basic staples declined in Indonesia while dairy, fresh fruit, and other high-value imports from the United States increased. The volume of Indonesia's dairy imports from the United States grew more than 30 percent per year between 1998 and 2008. The quantity of snack food imports increased more than 20 percent annually, and fresh fruit, 17 percent. Imports of processed fruit and vegetables also grew steadily at close to 7 percent per year. India's agri-

U.S. agricultural exports to Indonesia quadrupled between 1990 and 2008



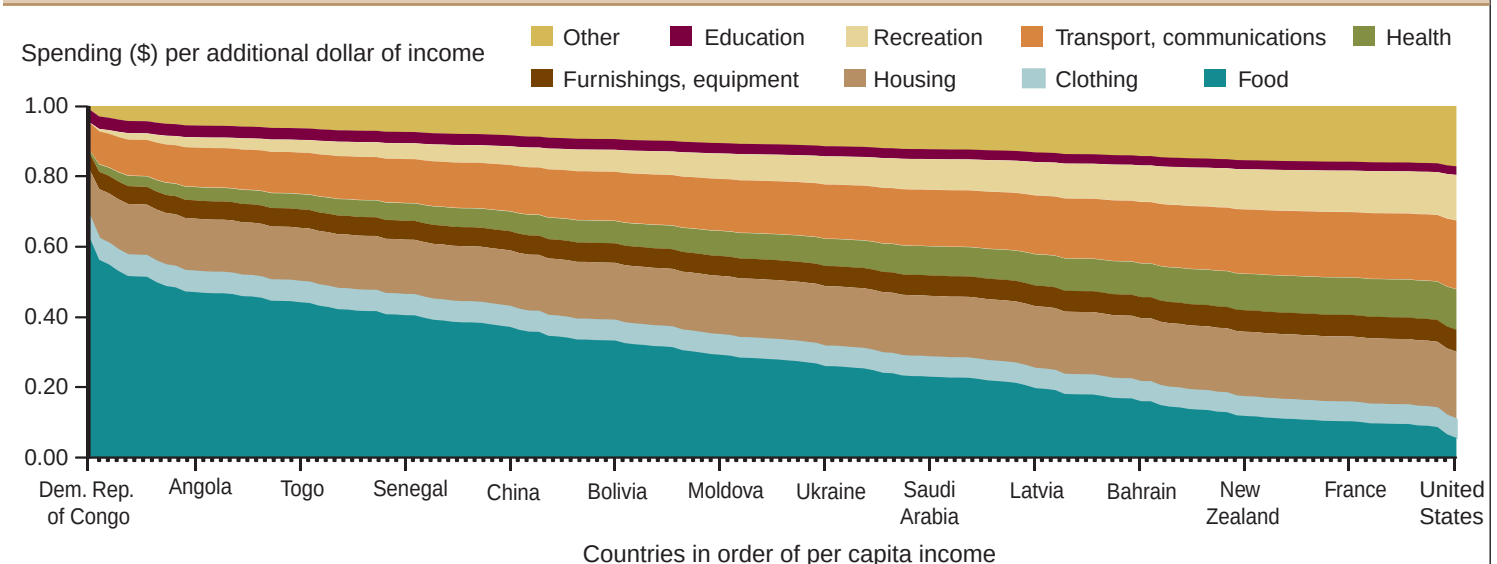
Source: USDA, Economic Research Service using U.S. Department of Commerce, U.S. Census Bureau, Foreign Trade Statistics.

cultural imports from the United States have similarly increased, with fresh fruit imports gaining 57 percent annually from 1998 to 2008 and snack food imports 35 percent each year.

Staples or High-Value Products: How Is Additional Income Spent?

Governments, policymakers, businesses, food producers, market analysts, and others concerned with global food trends can better anticipate future import demand if they know how income growth affects food spending. ERS researchers estimated two different measures of the effect of income growth on food spending. The *marginal share* shows how much of an additional dollar of income in a particular country is spent on food or other consumption categories, such as housing or recreation. For example, in extremely poor countries like the Democratic Republic of Congo and Burundi, over half of this additional dollar is spent on food. For countries such as India, Indonesia, and Colombia, which account for an increasing share of

How is an extra one dollar of income allocated across spending categories?



Source: USDA, Economic Research Service using International Comparison Program 2005 data.

U.S. agricultural exports, the portion of that extra dollar spent on food is between 28 and 39 cents. In high-income countries, less than 10 cents of that dollar—and only 4 cents in the U.S.—is spent on food.

A second measure—*income elasticity*—looks at the additional food or other spending as a result of a percentage increase in income rather than an across-the-board $1 increase. Obviously, one additional dollar in Tanzania is not the same as in the United States. Income elasticities are, therefore, a better measure of the responsiveness of demand to changes in income and are more comparable across countries. ERS researchers calculated these elasticities for broad consumption categories such as food, clothing, and housing, as well as for detailed food categories such as cereals, meats, dairy, and fruit and vegetables.

The ERS estimates were based on the 2005 International Comparison Program dataset, which covers 146 countries (2 countries were dropped in the ERS study) and offers a global perspective on consumption and food spending (see box, "The 2005 International Comparison Program Dataset"). For the analysis, ERS researchers divided the 144 countries into three income categories: low-income (having less than 15 percent of U.S. per capita income), middle-income (15-44 percent of U.S. per capita income), and high-income

In high-income countries, less than 10 cents of an additional dollar of income—and only 4 cents in the U.S.—is spent on food.

The 2005 International Comparison Program Dataset

The food demand and elasticity estimates are based on data provided by the International Comparison Program (ICP). The ICP is a worldwide statistical initiative to collect comparative price data and estimate purchasing power parities (PPP) of the world's economies.

The final dataset is based on results from two separate programs. The first is the global ICP conducted by the World Bank, which focused mostly on developing countries. The second was a program of data research conducted by the Statistical Office of the European Communities (Eurostat) and the Organisation for Economic Co-operation and Development (OECD) for 46 OECD member countries. The results of the 2005 ICP round are published as "Global Purchasing Power Parities and Real Expenditures, 2005 International Comparison Program, World Bank, 2008."

The ICP collects data on consumption spending, incomes, and prices. To account for differences in currency values, prices are based on purchasing power parities. Economists have known that using exchange rates to compare spending and the level of economic activity across countries can lead to misleading results, in part because exchange rates fail to account for the fact that services are cheaper in developing countries.

The most recent (2005) dataset provides budget and spending shares as well as PPPs covering 146 countries. These 146 economies account for more than 95 percent of the world's population and 98 percent of the world's nominal gross domestic product. Unlike previous ICP datasets, the 2005 data include a large number of low-income countries in Africa. Since 1996, when the previous dataset was released, the number of African countries included more than doubled from 22 to 48. Also, several new Asian countries have been included, most notably China and India.

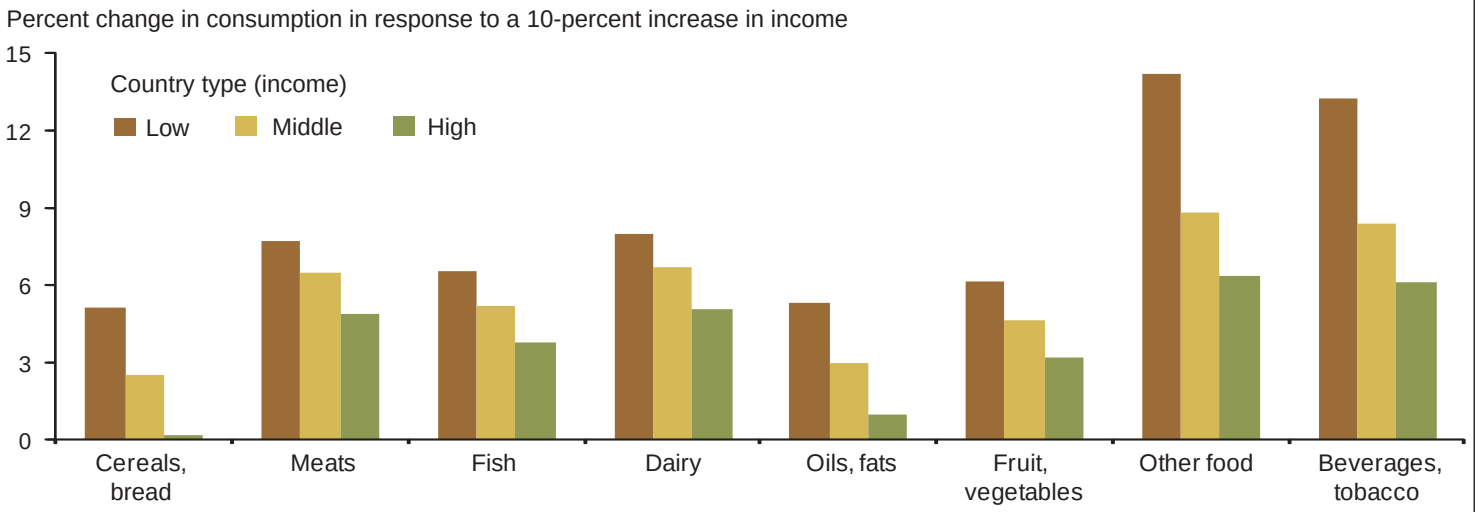
(greater than 45 percent of U.S. per capita income).

Low-income countries spend a smaller total amount but a much larger share of their incomes on food than both middle- and high-income countries. Households in Tanzania, for example, spend close to three-quarters of their income on food, while the share is about 12 percent in the U.S. Given that most food spending in low-income countries currently goes toward cereals and other staples, an income increase of 10 percent would raise spending on cereals (5 percent) by less than spending on meat and dairy (both 8 percent), which are considered high value and typically less affordable for households in low-income countries. In contrast, a 10-percent rise in income in high-income countries increases spending on meats and dairy by 5 percent each and on cereals by only 0.2 percent.

In most low-income countries, high-value food products and restaurant meals are luxury items—goods for which spend-

Walmart

Responsiveness of food consumption to increases in income is greater in developing countries than in higher income nations



Source: USDA, Economic Research Service using International Comparison Program data, 2005.

ing increases by a greater percentage than the increase in income. For example, a 10-percent increase in income in low-income countries boosts spending on high-value food items by 14 percent, more than twice the increase in high-income countries.

Agricultural Productivity as a Source of Income Growth

As developing-country incomes rise, the resulting increases in food demand may help expand U.S. agricultural export markets. But what are the catalysts for income growth in the poorest countries?

In a number of countries, improved domestic agricultural productivity is a strong driver of income growth. Many developing countries rely heavily on the

Maurice R. Landes, USDA/ERS

Agricultural productivity growth was above average in large lower and middle-income countries in 1990-2006

Country	1990 GDP per capita[1]	2005 GDP per capita[2]	GDP per capita growth rate, 1990-2006	Agricultural total factor productivity growth, 1990-2006
	2005 international dollars		*Percent*	
China	1,123	4,105	8.40	3.50
Colombia	4,943	5,910	1.50	2.40
India	1,185	2,225	4.20	1.60
Indonesia	2,089	3,212	3.20	1.90
Mexico	9,155	11,459	1.70	2.60
U.S.	31,630	41,774	1.75	1.79
World average	8,501	11,239	1.60	1.50
	(149 countries)	(149 countries)	(149 countries)	(172 countries)

Note: GDP = gross domestic product. An international dollar is a hypothetical currency that is used as a means of translating and comparing costs from one country to another using a common reference point, the U.S. dollar.

[1] 3-year average, 1989-91.

[2] 3-year average, 2004-06.

Source: USDA, Economic Research Service using the World Bank's World Development Indicators, 2008; and "Total Factor Productivity in the Global Agricultural Economy: Evidence from FAO Data," by Keith Fuglie, in *The Shifting Patterns of Agricultural Production and Productivity Worldwide*, 2008.

agricultural sector for economic growth, and agricultural productivity growth plays a key role in reducing poverty and improving food security.

Enhanced agricultural efficiency, through improved input quality or resource allocation, generates greater food availability, increases demand for industrial goods and services, and could result in higher export earnings. As agricultural productivity rises, a reinforcing cycle of supply and demand may be generated between agriculture and the rest of the economy, which can stimulate income growth. As agricultural efficiency improves, labor and capital are released to search out higher wages in other economic sectors, facilitating growth in the rest of the economy.

Developing countries such as India, Indonesia, and Colombia have achieved growth in agricultural productivity, while at the same time increasing U.S. agricultural imports. Agricultural productivity growth in these three countries from 1990 to 2006 was above the world average of 1.5 percent. During the same period, per capita gross domestic product (GDP) rose 4.2 percent in India, 3.2 percent in Indonesia, and 1.5 percent in Colombia, nearly matching or exceeding the global average of 1.6 percent.

As incomes rise, consumers purchase more higher value foods, including meat products. Increased demand for domestic meat, in turn, boosts demand for feed and fodder. Between 1998 and 2008, annual feed and fodder export volumes to Indonesia increased 28 percent, and those to India and Colombia increased 18 percent.

As incomes rise, consumers purchase more higher value foods, including meat products.

Developing Countries Will Strengthen Their Position as Important U.S. Agricultural Export Destinations

Future demand for agricultural products will increasingly come from developing countries, which have seen much higher income growth as a group than developed countries. Even during the recent worldwide recession, most developing countries were able to avoid the deep economic downturns experienced by many high-income countries. According to the International Monetary Fund, the GDP in emerging and developing countries grew 2.5 percent in 2009, while advanced economies shrank by more than 3 percent. Average annual growth in developing countries is projected at around 6.5 percent through 2015, compared with about 2.5 percent in advanced economies. Developing countries have faster growing populations and incomes, which are increasingly spent on high-value food products. The U.S. is well placed to compete in these new and expanding markets.

This article is drawn from . . .

ERS Briefing Room on Global Food Markets, www.ers.usda.gov/briefing/globalfoodmarkets/

You may also be interested in . . .

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Higher Carbon Prices Could Spur Adoption of Methane Digesters

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- A market price for carbon emission reductions would allow livestock producers with methane digesters to earn additional revenue from trapping and burning methane from manure.
- Greater income from reducing methane emissions could substantially increase the number of livestock producers who would find it profitable to install methane digesters.
- Large-scale hog and dairy operations with lagoon manure management systems are likely to benefit most from a higher carbon price, which could have longrun structural implications for the livestock sector.

Methane digesters that collect and burn methane from manure can provide numerous benefits to livestock producers and the environment. Still, digesters have not been adopted widely, mainly because the costs of constructing and maintaining these systems have exceeded the benefits accruing to operators. Currently, there are 157 methane digesters operating in the U.S., of which 126 are on dairies and 24 are on hog operations.

Methane is a potent greenhouse gas (GHG), and burning 1 ton of methane is equivalent to eliminating about 24 tons of carbon dioxide. There are a number of policies that could encourage farmers to use a digester to reduce methane emissions, either by providing financial inducements for those who install a digester or by penalizing those who do not (see box, "Policy Options for Mitigating Methane Emissions From Manure Management").

A carbon offset market is one mechanism currently used for valuing methane emissions reductions. An offset market allows livestock producers who reduce methane emissions to sell these reductions, or "carbon offsets," to other greenhouse gas emitters who face emissions caps or who voluntarily wish to offset their own emissions. Currently, only a few U.S. livestock operators sell offsets in regional or voluntary carbon offset markets. This is partly because the carbon prices in these markets have been low. However, future efforts to reduce greenhouse gas emissions could result in substantially higher carbon prices.

If farmers could earn a higher price for their methane emissions reductions, then digesters could become profitable on many more operations. However, there is likely to be wide variation in the scale, location, and characteristics of the operations that would benefit. The main beneficiaries would be producers whose operations emit

Environmental Credit Corp.

A covered anaerobic lagoon; methane is captured and piped to the combustion device.

substantial quantities of methane—particularly, dairy and hog operations with lagoon or pit manure storage facilities. Among these, larger scale operations will likely profit more from higher carbon prices because it is generally more cost effective to construct and operate larger digesters than smaller ones. Consequently, in the long run, valuing emissions reductions could encourage further concentration in the dairy and swine industries unless ways are found to promote the adoption of digesters on small-scale operations.

Digester Profitability and Adoption Depend on Farm Size, Location, Manure Management System, and Carbon Price

Methane digesters, also known as "anaerobic digesters," "biodigesters," or "biogas recovery systems," can be used to capture and burn methane from lagoon or pit-type manure storage facilities. With lagoons (earthen storage ponds), covers are installed to capture the methane. With pit systems (concrete or metal tanks located above or below ground), manure can be heated to encourage methane production. Digesters collect manure, optimize it for the production of methane by adjusting temperature and water content, capture the biogas, and burn it for heat or electricity generation. Burning methane reduces its global warming potential, which corresponds to a reduction in greenhouse gas emissions that could be marketed as a carbon offset.

Several factors influence the profitability of methane digesters and consequently determine which types of producers are likely to adopt the technology. These factors include an operation's manure management method, startup and ongoing costs of a digester, buying and selling price of electricity, onfarm electricity expenditures, and carbon offset price. Many of these factors vary with farm size and location.

Policy Options for Mitigating Methane Emissions From Manure Management

There are several possible policy approaches to mitigating methane emissions from manure management. The effectiveness and the distributional implications of these policies are likely to be very different. One approach is to regulate emissions levels on individual operations. This would give producers an incentive to adopt technologies, such as digesters, to comply with the standards. Another regulatory approach is to require specific emissions reduction technologies, such as lagoon covers and methane flares. Digester adoption could be encouraged with cost subsidies or other incentives, such as grants, cost shares, incentive payments, tax credits, or exemptions. Many existing incentive programs are designed to promote renewable energy, in addition to lowering greenhouse gas (GHG) emissions.

Policy approaches that use a price-based mechanism include taxes on GHG emissions or on the "carbon content" of commodities, such as meat or milk (the tax rate would depend on the quantity of GHGs emitted during production). Another approach is for individuals or firms who wish to "offset" their own emissions to pay farmers for reducing methane emissions. Such marketable emissions reductions or offsets are measured in tons of carbon dioxide equivalent emissions (reductions in other greenhouse gases such as methane are converted to an equivalent quantity of carbon dioxide based on that gas's global warming potential). Carbon offsets can be exchanged in markets established to satisfy regulatory compliance or in voluntary markets.

Compliance markets develop when regulations limit the amount of GHGs firms can emit, but permit regulated firms to trade emissions allowances. Under such a system, known as cap-and-trade, regulated firms (such as power plants) must obtain permits to emit GHGs. To meet their emissions targets, regulated firms can reduce their own emissions or purchase allowances from other "capped" firms. Alternatively, when allowed, regulated firms can pay nonregulated emitters, which might include livestock operations, to reduce emissions.

Current examples of compliance markets include the Kyoto Protocol and the European Union's Emissions Trading Scheme. While the United States does not have a national compliance market at present, the U.S. Congress has considered several bills in recent years that would have established a national cap-and-trade system. Additionally, 10 Eastern States recently implemented the Regional Greenhouse Gas Initiative (RGGI), the first mandatory domestic market-based effort to reduce GHG emissions. Voluntary offset markets allow companies and individuals to purchase carbon offsets. For example, individuals might seek to offset their travel-related emissions or firms might seek to compensate for emissions related to their products. In the U.S., the Chicago Climate Exchange (CCX) is a voluntary, but legally binding, carbon trading regime.

In the major international compliance markets, carbon prices ranged between $15 and $30 per ton in the past decade. U.S. offset prices have been much lower. The average price for carbon allowances in the RGGI ranged between $1 and $3 per ton since its inception in 2008 through 2010. The CCX carbon price ranged between $1 and $7 per ton between 2004 and 2008 but has traded under $1 per ton since 2009.


A plug flow pit-based methane digester.
AgSTAR

Only operations that generate a significant quantity of methane are viable candidates for biogas recovery systems. When manure is kept in oxygen-free (anaerobic) conditions that exist in lagoons, ponds, tanks, or pits, it decomposes to produce a biogas containing about 60 percent methane. When manure is in oxygen-rich environments, such as when it is deposited on fields, it generally produces little methane. Many dairy and swine operations employ anaerobic manure management facilities. Dairy cattle and swine are each responsible for 43 percent of U.S. methane emissions from livestock manure. Other livestock sectors predominantly using aerobic manure management methods, including beef cattle, sheep, poultry, and horses, are collectively the source of only 13 percent of emissions.

Anaerobic manure management methods are generally more common on large-scale operations. For example, only 38 percent of dairy operations with fewer than 250 head use anaerobic manure management systems, compared with 56-73 percent of larger operations. Consequently, larger operations produce a disproportionate share of methane emissions; dairies with more than 2,500 head accounted for 19.7 percent of total emissions in 2005, though they only produced 13 percent of dairy output.

There is substantial variation across regions in manure management methods and, consequently, methane emissions. Dairies in the West and South are much more likely to have lagoon systems than those in the Midwest and Northeast. Dairies in the West produce 43 percent of all emissions from the dairy sector, reflecting that region's large share of output and the prevalence of lagoon systems.

Factors determining digester profitability vary by dairy size and region, 2005

Category	Number of farms in category	Percent of dairy output	Percent with lagoon or pit manure system	Percent with lagoon (could also have pit)	Percent of total methane emissions	Electricity use per head (kWh)	Electricity price ($/kWh)
All farms	52,237	100	42	11	100	1,048	0.069
Number of head							
>2,500	248	13.0	55.6	48.0	19.7	494	0.078
1,000-2,499	917	18.3	63.5	38.9	20.9	723	0.081
500-999	1,615	14.1	71.3	41.5	18.4	743	0.079
250-499	3,040	13.5	72.8	40.0	16.0	775	0.068
<250	46,417	41.1	38.0	6.9	25.0	1,085	0.068
Region							
West	6,095	33.3	56.5	38.1	43.1	893	0.058
Midwest	28,438	36.4	40.2	5.8	26.0	1,102	0.064
South	4,034	9.2	53.0	27.1	15.6	791	0.065
Northeast	13,670	21.1	34.3	3.8	15.3	1,080	0.085

Note: All dollar values are in 2009 real (adjusted for inflation) terms.

Source: USDA, Economic Research Service estimates using data from USDA's 2005 Agricultural Resource Management Survey, Dairy Cost of Production Survey.

Digesters revenues flow disproportionately to large dairies and dairies in the West, 2005[1]

Category	Number of farms that would earn positive profits	Revenues from offset sales	Value of generated electricity	Net revenues from digester	Average net revenues from digester per farm	Average net revenues from digester per head
		Million dollars			*Dollars*	
All farms	1,848	1,392	1,050	908	491,478	304
Number of head						
>2,500	138	449	271	419	3,039,112	654
1,000-2,499	521	457	460	323	620,599	410
500-999	732	352	249	147	201,158	286
250-499	458	134	71	19	42,091	108
<250	0	0	0	0	0	0
Region						
West	972	780	559	542	558,212	332
Midwest	281	162	164	72	257,720	165
South	354	243	151	152	429,384	334
Northeast	242	206	177	142	585,716	312

[1]Carbon price = $13 per ton.

Notes: Revenues correspond to the net present value of a project with a 15-year lifespan discounted at a rate of 5 percent. All dollar values are in 2009 real (adjusted for inflation) terms.

Source: USDA, Economic Research Service estimates using data from USDA's 2005 Agricultural Resource Management Survey, Dairy Cost of Production Survey.

The costs of building, maintaining, and repairing manure storage facilities and electricity generators generally decline on a per head basis with the size of the operation, which makes digesters more cost effective for larger scale operations. In addition, there can be substantial transactions costs associated with selling electricity or certifying and marketing carbon offsets. Larger operations can spread these costs over a larger revenue base.

Digester profitability depends on the value of the electricity generated, which varies by farm size (electricity use per head declines, on average, as herd size increases) and by region (electricity is most expensive in the Northeast and least expensive in the West). In most States, operations that generate more electricity than they use can sell their surplus electricity to the grid. However, the selling price of electricity varies widely and depends, in part, on whether local utilities are required to purchase renewable energy. Renewable energy mandates can substantially raise the selling price for digester-generated electricity and make adopting a digester more profitable. Whether an operation has surplus electricity depends on its generating capacity relative to its demand. On average, dairies in the West and South use substantially less electricity per head than farms in the Midwest or Northeast, and so have more electricity to sell.

Revenues From Increasing Carbon Prices Mainly Would Accrue to Large Dairies in the West

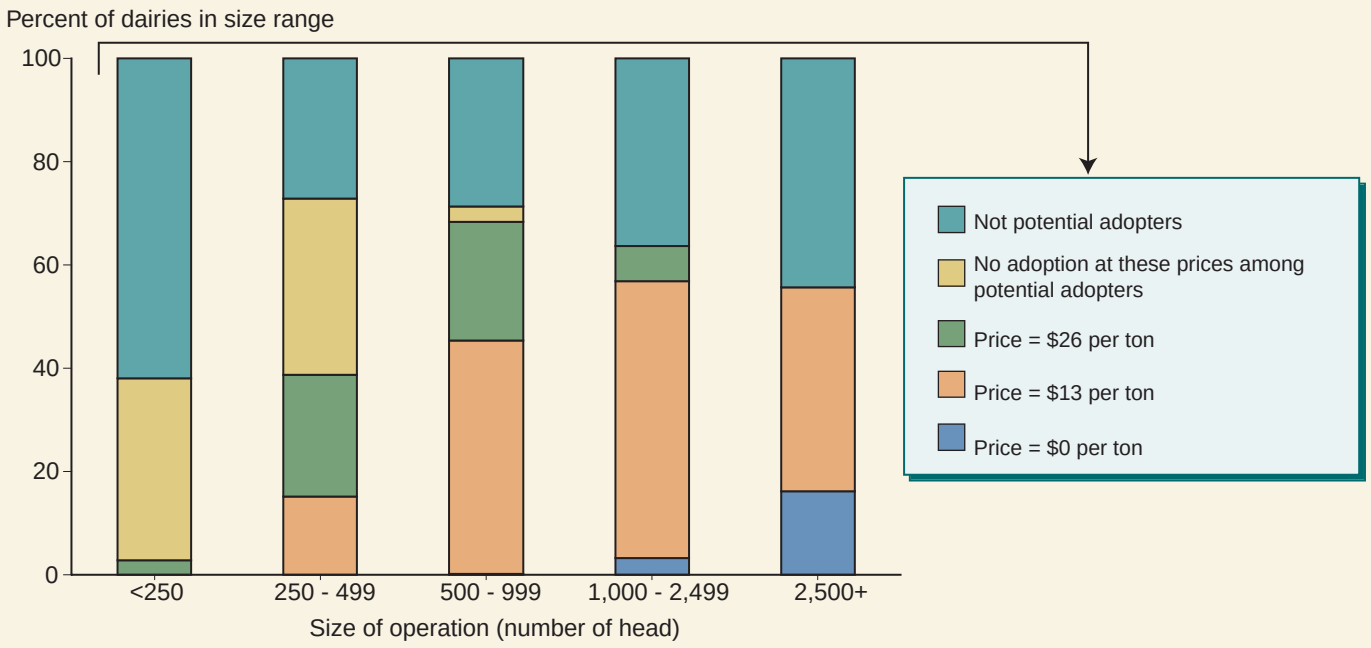
ERS researchers used data from USDA's Agricultural Resource Management Survey (ARMS) and a model of digester profitability to estimate the number, size, and location of dairy and hog operations that might adopt a methane digester at different carbon offset prices. ARMS is conducted by ERS and USDA's National Agricultural Statistics Service (NASS). The researchers also estimated the distribution of the discounted stream of revenues over the life of the digester from emission reductions, the value of electricity generated, and total profits.

Research results indicate that even with moderate carbon offset prices, offset sales could substantially increase revenues for farms with digesters. At $13 per ton for carbon, the revenues from offset sales for dairies would exceed the value of digester-generated electricity by almost 30 percent. The revenues from digesters would accrue mainly to large-scale operations. Over 15 years, digesters would be worth $419 million to dairy operations with at least 2,500 head, or about 46 percent of the total value of dairy digesters.

Mixing tanks at a "complete mix" pit-based digester.

AgSTAR

Higher carbon offset prices would increase the percent of dairies that could earn positive net revenues from a digester



Notes: Percentages at higher prices are additive to those for lower prices; for example, at a price of $13 per ton, an additional 54 percent of operations of size 1,000-2,499 are predicted to adopt, for a total of 57 percent of operations of this size. At a carbon price of $13 per ton, no operation smaller than 250 head is predicted to adopt. At a carbon price of $0 per ton, no operations with fewer than 500 head and 0.1 percent of operations with 500-999 head are predicted to adopt.

Source: USDA, Economic Research Service estimates using data from USDA's 2005 Agricultural Resource Management Survey, Dairy Cost of Production Survey.

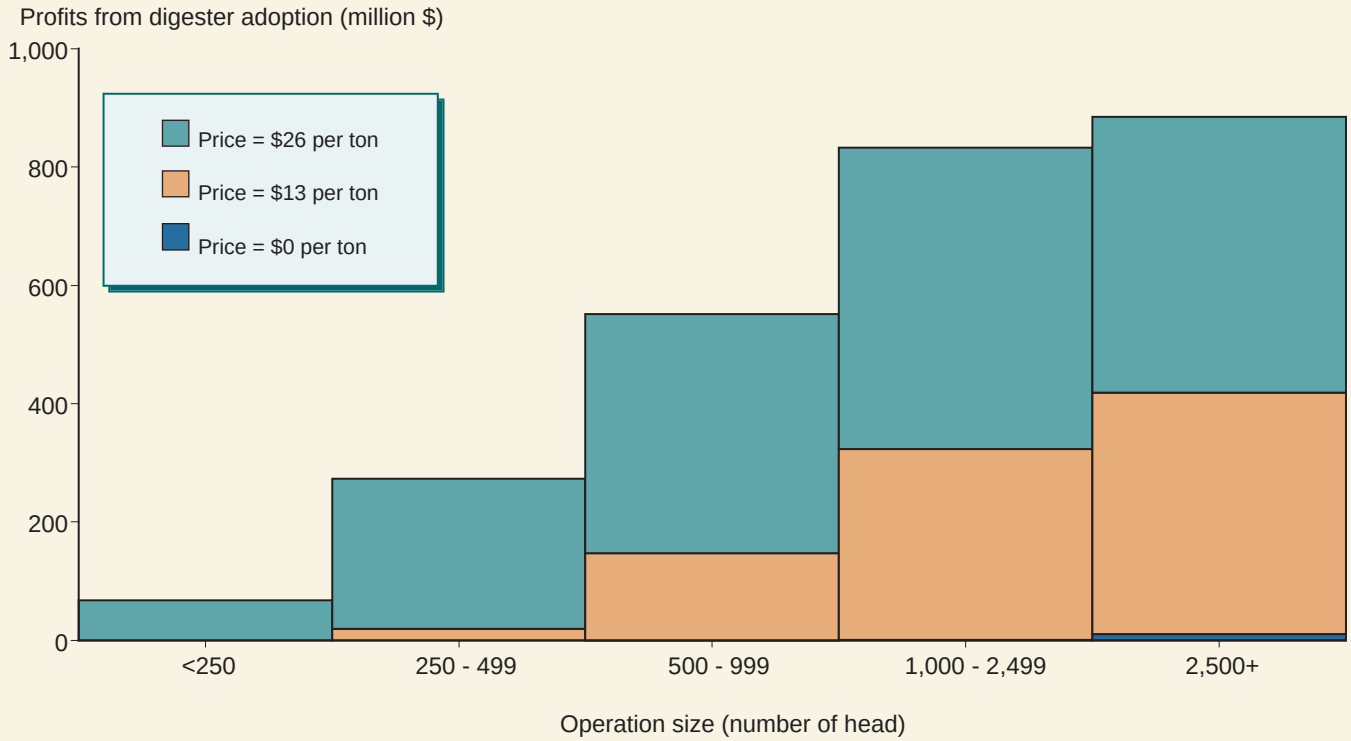
Profits per farm and per head increase with farm size, which could give larger operations a substantial competitive advantage. At $13 per ton, it would not be profitable for operations with fewer than 250 head to adopt a digester. Regionally, dairies in the West would receive almost 60 percent of total digester profits, reflecting the prevalence of large-scale dairies in the region.

As carbon offset prices increase, more small-scale operations would find it profitable to adopt a digester. When there is no offset market (a price of zero), only operations with at least 1,000 head earn profits from operating a digester. However, if the offset price increases to $13 per ton, 15 percent of farms with 250-499 head and 45 percent of farms with 500-999 head would earn profits. If the price increases to $26 per ton, 3 percent of farms with fewer than 250 head and 39 percent of farms with 250-499 head would find it profitable to adopt a digester.

The substantial share of dairy operations without anaerobic manure management systems likely could not sell carbon offsets even if they were to install digesters. Farms that replace an aerobic manure management system (such as depositing manure on fields) with a pit or lagoon system would actually increase methane emissions. Even if the same farms then added digesters and reduced emissions to prior levels, these reductions likely would not qualify as carbon offsets. To be eligible as carbon offsets, emissions reductions usually must be "additional" to "business as usual"; as the level of emissions with aerobic manure management would be about the same as with anaerobic manure management plus a digester, there would be no additional reductions in methane emissions.

Higher offset prices would increase the profits that the livestock sector could earn from digesters. Over 15 years, the value of digesters to dairies is about $11 million with no offset market, about $908 million with a carbon price of $13 per ton, and $2.6 billion with a price of $26 per ton. Digester profits accrue mostly to large farms regardless of the carbon price. However, higher prices increase the

Net revenues from digesters accrue mainly to large operations and increase with carbon price



Source: USDA, Economic Research Service estimates using data from USDA's 2005 Agricultural Resource Management Survey, Dairy Cost of Production Survey.

An engine generator that combusts biogas for use on farm. AgSTAR

number of smaller farms that could benefit from an offset program, which causes the distribution of benefits to become somewhat less skewed toward the largest operations. Dairies with at least 2,500 head earn 94 percent of digester profits with no offset market, compared with 48 percent at a price of $13 and 37 percent at a price of $26.

Policies and Facility Sharing Could Enable Smaller Livestock Operations To Build Profitable Digesters

Depending on the price of carbon, the additional income from offset sales could substantially increase the number of livestock producers who would find it profitable to install methane digesters. In recent decades, the scale of production in the dairy and hog sectors has increased dramatically. Dairies with at least 1,000 head now produce almost a third of output, despite accounting for only about 2 percent of all operations. The additional profits that large farms could earn from digesters could enhance existing economies of scale in dairy and hog production and promote further consolidation of production over time.

One way for smaller scale livestock operations to achieve a more efficient scale is by supplementing manure with food waste from nearby crop or meat processing facilities, breweries, bakeries, and restaurants. When mixed with manure, food waste can provide an efficient feedstock for biogas production, and as an added incentive, livestock operators could collect waste disposal fees from the food facilities. However, the availability and suitability of food waste for use in methane digesters may restrict the feasibility of such mixtures to certain locations.

A centralized digester is another way that smaller scale operations could take advantage of a more efficient digester size. With several nearby farms using a single large digester, participating operations could share construction and maintenance costs; increase their leverage to negotiate electricity sales; improve access to financing, tax credits, or grants; and allow a manager to develop specialized skills in digester maintenance and operations. The main disadvantage to centralized digesters is the additional cost of transporting manure to and from the central facility.

If carbon offset prices are sufficiently high, a lower cost biogas system that flares methane rather than uses it to generate electricity may become profitable. This approach removes electricity generation from the biogas system, which eliminates the costs of the generator, electrical connections, and much of the maintenance. The lower cost biogas system might be economically viable for smaller scale operations that would find it difficult to finance or maintain an electricity generator. This option has the greatest potential for operations with lagoons, since lagoon covers can be installed relatively inexpensively, and offers other benefits to producers, such as reducing odor and increasing lagoon storage capacity by excluding rainwater.

Policies that raise returns to or lower costs of digesters can provide incentives for smaller scale operations to adopt the technology. Policies could include grants, such as USDA's Rural Energy for America Program Grants, and incentive payments, such as the U.S. Department of Energy's Renewable Energy Production Incentive. Other policy options include tax credits, such as the Renewable Electricity Production Tax Credit, accelerated depreciation (allowing construction costs to be written off faster for tax purposes), property and sales tax exemptions (usually at the State level), and other regulations, such as renewable energy mandates that raise the effective price of electricity sold to the grid. Many of these policies can be targeted toward smaller scale operations.

This article is drawn from . . .

Climate Change Policy and the Adoption of Methane Digesters on Livestock Operations, by Nigel Key and Stacy Sneeringer, ERR-111, USDA Economic Research Service, February 2011, available at: www.ers.usda.gov/publications/err111/

Photo: John Cromartie, USDA/ERS

Mapping Population and Economic Trends in Rural and Small-Town America

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An interview with one of the authors is featured online at: www.ers.usda.gov/podcast/

Nearly 50 million people live in nonmetropolitan (nonmetro) America, covering approximately 2,000 counties. Nonmetro areas—widely used to depict rural and small-town conditions and trends—contain 17 percent of the U.S. population but extend across 80 percent of the land area. Economic and social challenges facing rural areas and small towns differ greatly from those affecting larger U.S. cities, and the opportunities for rural population growth and economic expansion vary substantially from one nonmetro county to the next.

The ERS Atlas of Rural and Small-Town America helps shed light on the overall scope and diversity of demographic, economic, and social trends across the United States by providing county-level mapping of over 60 statistical indicators. Along with nonmetro-metro differences, interactive features of the Atlas enable users to view indicators for the full array of ERS county typologies, such as nonmetro counties that are farm dependent, persistently high poverty, or recreation based. Knowledge regarding the population's age structure, race and ethnicity, income, employment, and other measures in different geographic areas can help national, State, and local policymakers create economic development strategies targeting challenges specific to particular regions and building on local assets. For example, planners in rural Great Plains communities may want to compare population trends in their area with those in less-isolated communities.

Atlas Features New Data From the American Community Survey

The Atlas of Rural and Small-Town America assembles the latest county-level statistics from the U.S. Census Bureau, the Bureau of Labor Statistics (BLS), the Bureau of Economic Analysis, USDA, and other Federal sources. The debut of the Atlas follows the release of the first full set of county-level data from the Census Bureau's American Community Survey (ACS). For hundreds of small counties throughout the U.S., these data offer the first chance to measure key socioeconomic information since the previous decennial census in 2000. New population profiles from the ACS (such as percentage of elderly or foreign born) are combined with the latest agricultural statistics from USDA, employment data from the BLS, and other indicators in four broad categories:

- **People**—county demographic profiles, including age, race/ethnicity, education, family composition, population change, migration, and immigration.
- **Jobs**—conditions and trends affecting the labor force, such as employment change, unemployment, industry, and occupational structure.

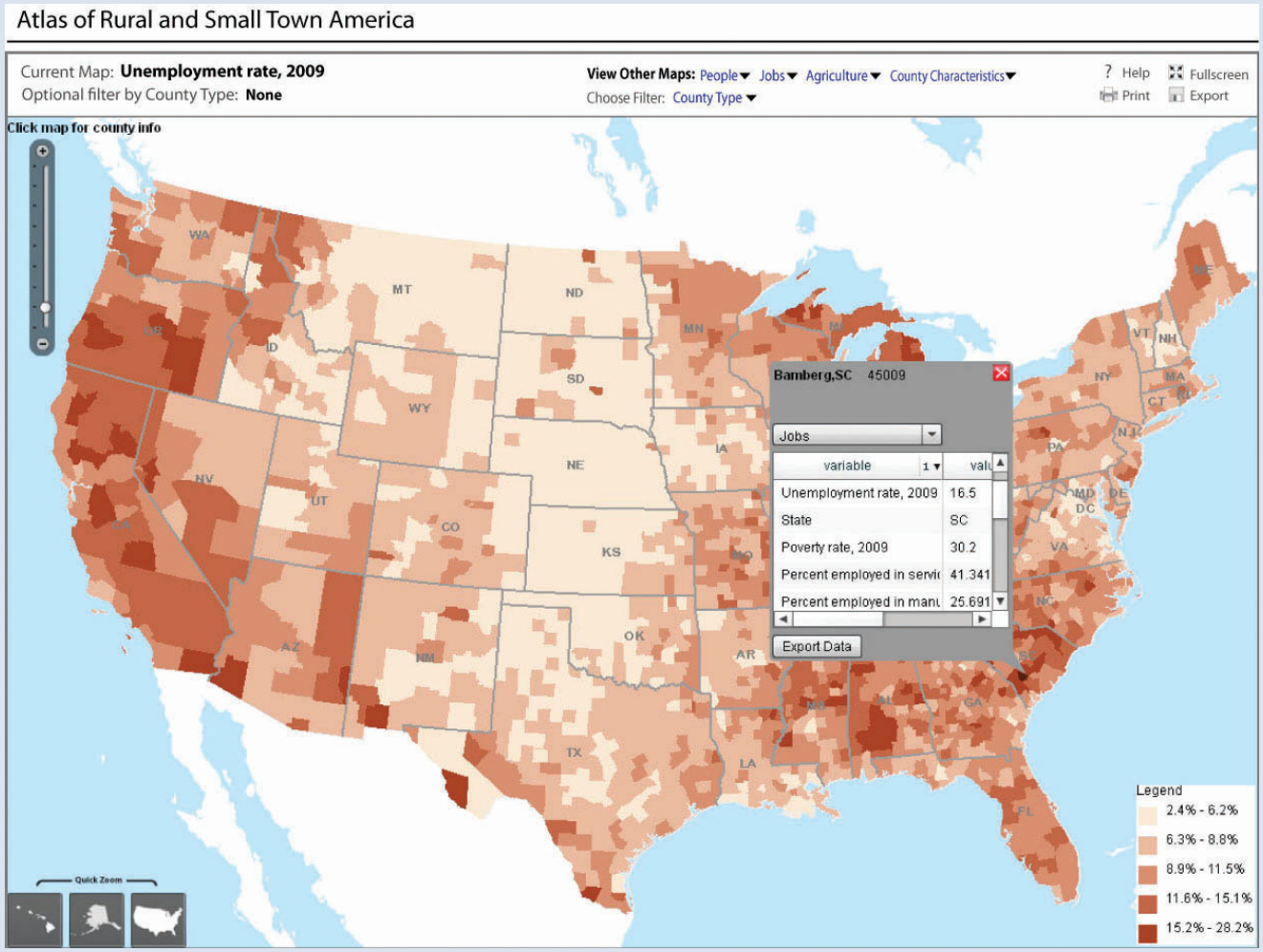
- **Agriculture**—indicators of farm structure and the well-being of farm households, including farm size, income, sales, and tenure.
- **County classifications**—ERS county classifications based on the rural-urban continuum, economic structure, and other key locational features, such as landscape amenities, creative class occupations, persistent poverty, or population loss status.

The time periods for the data vary because they are obtained from multiple sources. ACS demographic data, for example, represent average conditions in counties in 2005-09, while employment data measure 1-year averages through 2009. Most of the farm data come from the 2007 Census of Agriculture. Metro-nonmetro status and other county classifications, currently based on 2000 decennial census data, will be updated when the 2010 Census becomes available.

What Can Users Do With the Atlas?

The Atlas allows users to create county-level maps showing the variation in key socioeconomic conditions across the United States. The first map, reproduced from the Atlas, depicts county-level unemployment, showing high rates in the Pacific Northwest, northern Michigan, and parts of the Southeast, compared with lower rates in the Great Plains and Intermountain West. Employment data in the Atlas show that many pockets

Michigan hit hard by unemployment in 2009, along with parts of the South and Far West



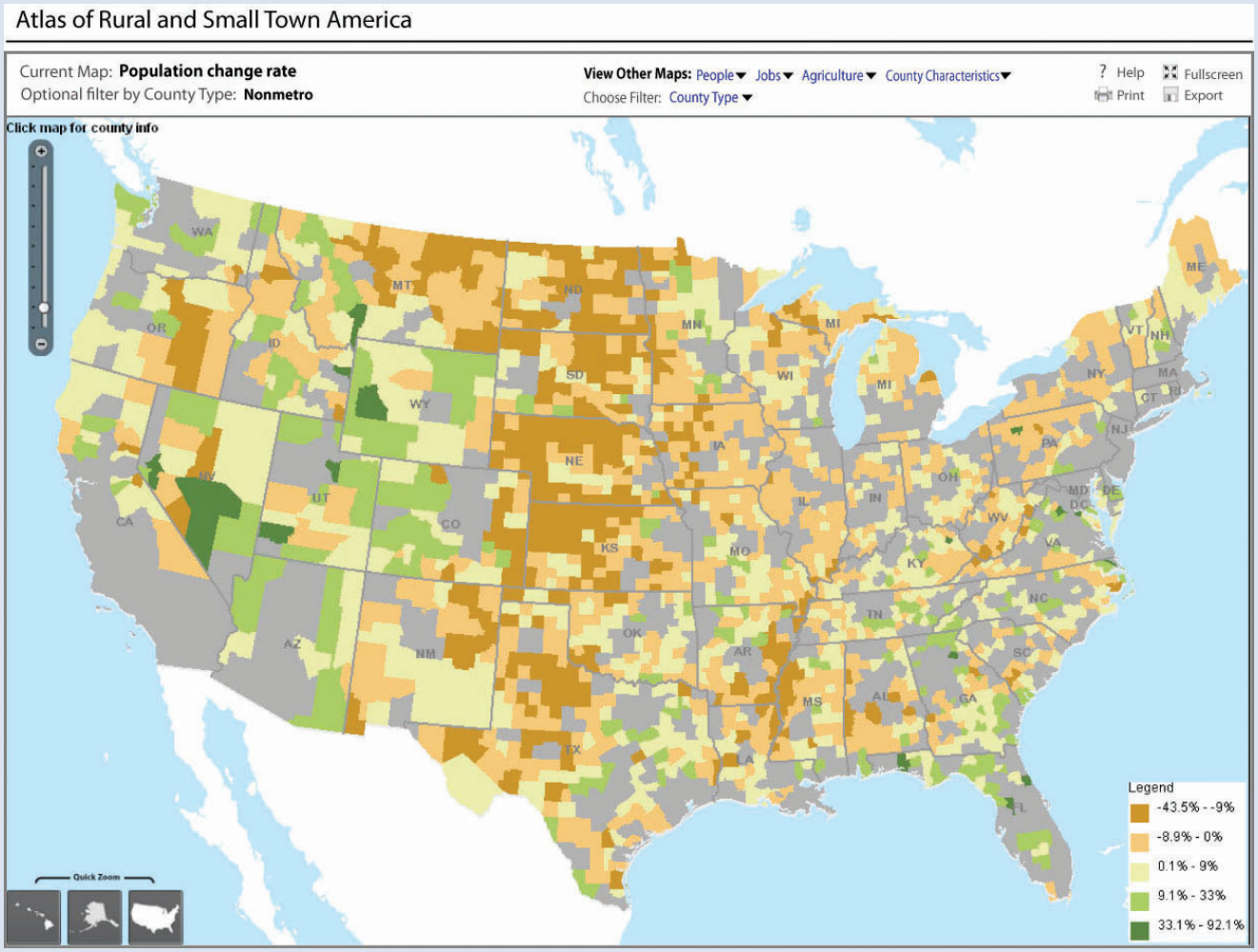
of high unemployment also have large percentages of workers employed in manufacturing.

Clicking on any county produces a pop-up box containing statistics for all indicators in the category relevant to the county. If a user clicks on Bamberg County, SC, for example, a pop-up box shows that 16.5 percent of Bamberg's workers were unemployed in 2009 and that 16 percent of those employed had jobs in manufacturing.

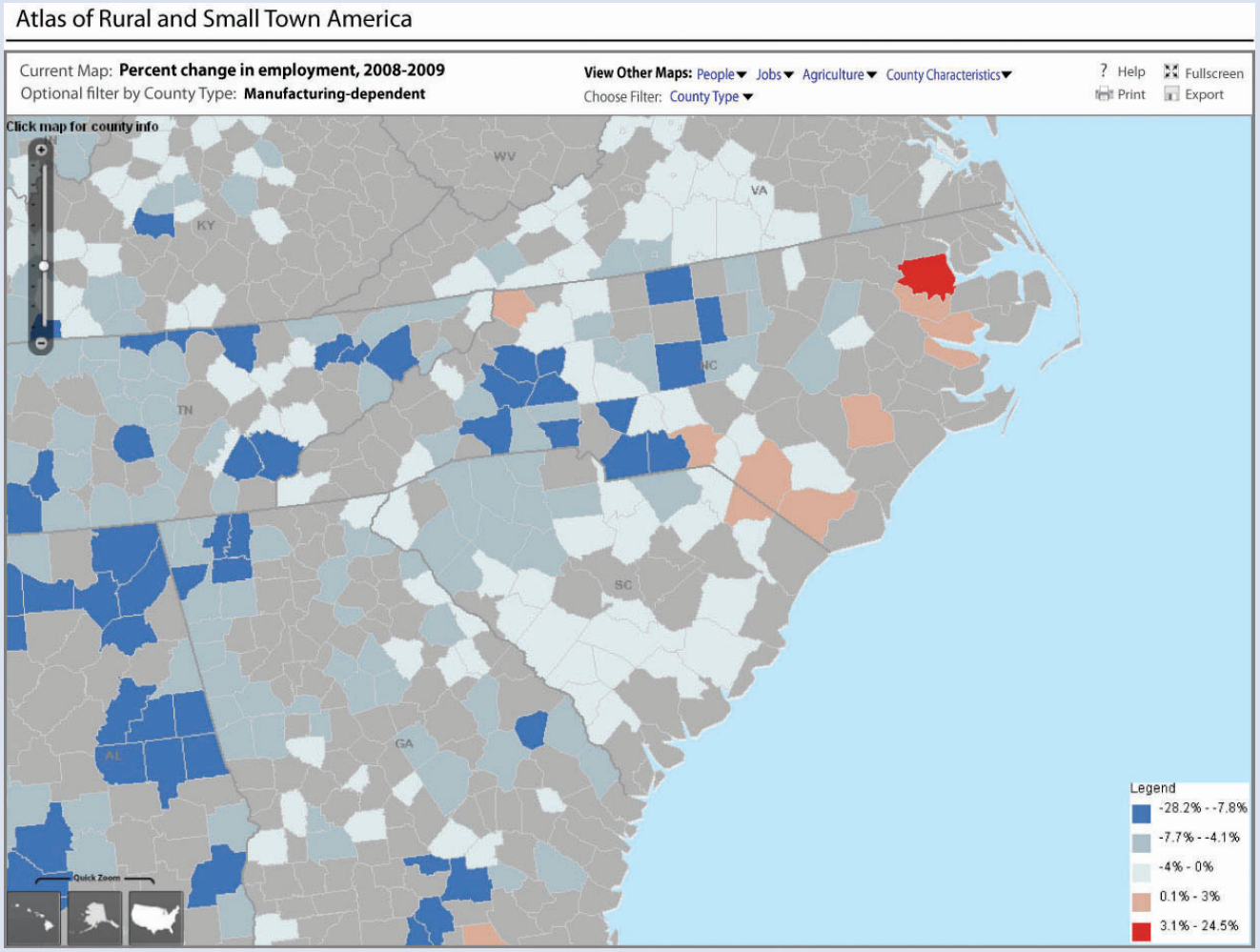
The Atlas also enables users to selectively highlight groups of counties based on nonmetro-metro status and other county typologies. For example, the second map shows population change for nonmetro counties, highlighting the difficulties that relatively remote communities may have in attracting new residents.

The map clearly shows that the vast majority of rapidly growing nonmetro counties are adjacent to metro areas.

Nonmetro population growth in the Mountain West contrasts with loss throughout the Great Plains



The Piedmont South's manufacturing-dependent counties continue to exhibit high job loss



However, more isolated communities with scenic amenities, such as mountains and bodies of water, also typically have growing populations.

The Atlas includes easy-to-use zoom and panning features; users may click on the scaling bar (upper left) for zooming or use a mouse to move around. The last map shows employment change since 2000 for South Carolina and vicinity, with nonmetro manufacturing counties highlighted. The concentration of employment loss over the past 10 years in counties dependent on manufacturing is clearly depicted.

Once a user has configured a map to his or her satisfaction, the map may be printed or saved to a PDF- or JPG-formatted file. An appropriate title and legend is generated automatically. Users will be able to download the data found in the Atlas in ready-to-use Excel files that include State summaries of all the data. With regular updates of available data, the Atlas can be a quick, easy way of getting an overview of conditions and trends affecting rural America.

This article is drawn from . . .

ERS Atlas of Rural and Small-Town America, available at: www.ers.usda.gov/data/ruralatlas/

Data may have been updated since publication. For the most current information, see www.ers.usda.gov/publications/agoutlook/aotables/

Farm, Rural, and Natural Resource Indicators

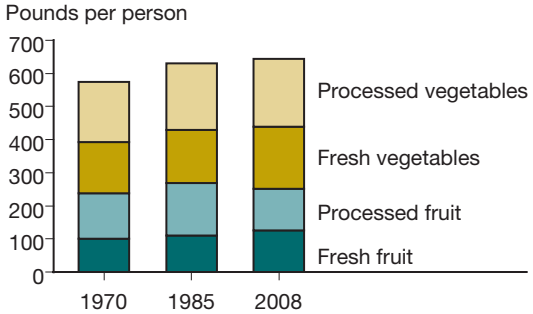
						Annual percent change			
	2006	2007	2008	2009	2010	2006-07	2007-08	2008-09	2009-10
Cash receipts ($ bil.)	240.6	288.5	318.3	283.4	312.9f	19.9	10.3	-34.9	29.5
Crops	122.1	150.1	176.8	163.7	173.1f	22.9	17.8	-13.1	9.4
Livestock	118.5	138.5	141.5	119.8	139.8f	16.9	2.2	-21.8	20.4
Direct government payments ($ bil.)	15.8	11.9	12.2	12.3	12.4f	-24.7	2.5	1.5	-18.8
Gross cash income ($ bil.)	273.2	318.0	352.0	317.6	346.4f	16.4	10.7	-9.8	9.1
Net cash income ($ bil.)	68.4	77.7	90.4	69.1	92.5f	13.6	16.3	-23.6	33.8
Net value added ($ bil.)	100.7	117.2	136.6	112.0	132.0f	16.4	16.6	-18.0	20.9
Farm equity ($ bil.)	1,720.0	1,841.2	1,780.6	1,811.8	1,879.9f	7.0	-3.3	1.8	3.7
Farm debt-asset ratio	10.6	10.4	12.0	11.9	11.3f	-1.9	15.4	-0.8	-5.0
Farm household income ($/farm household)	81,043	88,796	79,796	77,169	83,194f	9.6	-10.1	-3.3	7.8
Farm household income relative to average U.S. household income (%)	121.7	131.3	116.6	113.5	na	na	na	na	na
Nonmetro-metro difference in poverty rate (% points)[1]	3.4	3.5	2.2	2.7	na	na	na	na	na
Cropland harvested (million acres)	304	312	317	310p	na	2.6	1.6	-2.2	na
USDA conservation program expenditures ($ bil.)[1,2]	4.3	4.4	4.6	4.8p	5.7f	2.5	6.0	4.1	18.4

Food and Fiber Sector Indicators

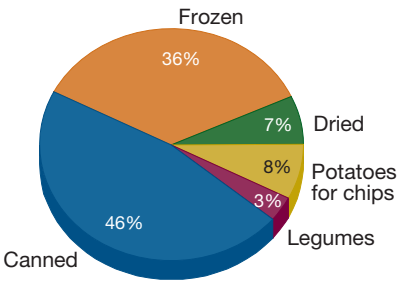
U.S. gross domestic product ($ bil.)	13,399	14,062	14,369	14,119	14,698f	4.9	2.2	-1.7	4.1
Share of agriculture & related industries in GDP (%)[1]	4.6	4.6	4.6	4.6	4.6f	na	na	na	na
Share of agriculture in GDP (%)[1]	0.7	0.8	0.9	0.7	0.9f	na	na	na	na
Total agricultural imports ($ bil.)[2]	64.0	70.1	79.3	73.4	79.0	9.5	13.1	-7.4	7.6
Total agricultural exports ($ bil.)[2]	68.6	82.2	114.9	96.3	108.7	19.8	39.8	-16.2	12.9
Export share of the volume of U.S. agricultural production (%)[1]	22.9	24.4	22.3	23.0f	na	na	na	na	na
CPI for food (1982-84=100)	195.3	202.9	214.1	218.0	219.7	3.9	5.5	1.8	0.8
Share of U.S. disposable income spent on food (%)	9.8	9.5	9.4	9.5	na	na	na	na	na
Share of total food expenditures for at-home consumption (%)	51.5	50.7	50.9	51.4	na	na	na	na	na
Farm-to-retail price spread (1982-84=100)	246.2	248.1	267.0	276.5	na	0.8	7.6	3.6	na
Total USDA food and nutrition assistance spending ($ bil.)[2]	53.1	54.3	60.9	79.2	95.3	2.3	12.2	30.0	20.3

f = Forecast. p = Preliminary. na = Not available. All dollar amounts are in current dollars.
[1]The methodology for computing these measures has changed. These statistics are not comparable to previously published statistics.
Sources and computation methodology are available at: www.ers.usda.gov/amberwaves/indicatorsnotes.htm
[2]Based on October-September fiscal years ending with year indicated.

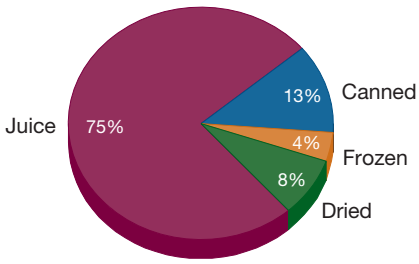
In 2008, 205 pounds of processed vegetables and 123 pounds of processed fruit were available for consumption per person in the U.S.



Canned and frozen were the most popular forms of processed vegetables consumed in 2008



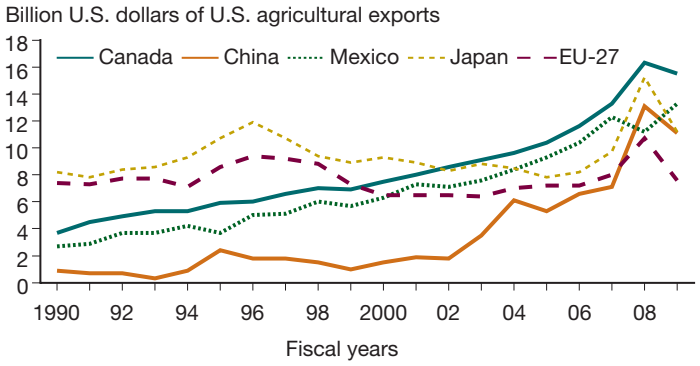
Three-quarters of processed fruit was consumed as juice in 2008



For more information, see www.ers.usda.gov/amberwaves/

Markets and Trade

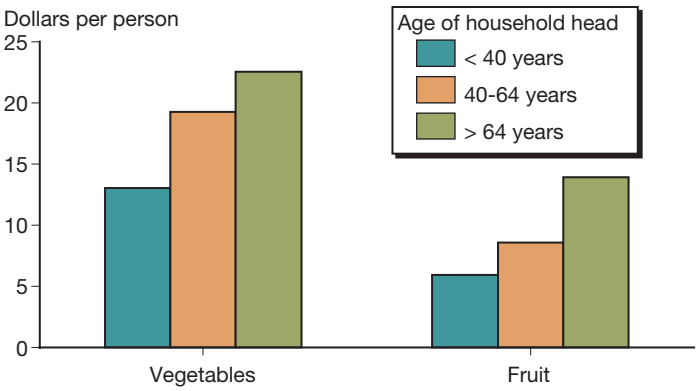
NAFTA partners and China are top importers of U.S. agricultural goods



Source: USDA, Economic Research Service using data from the U.S. Department of Commerce, U.S. Census Bureau.

Diet and Health

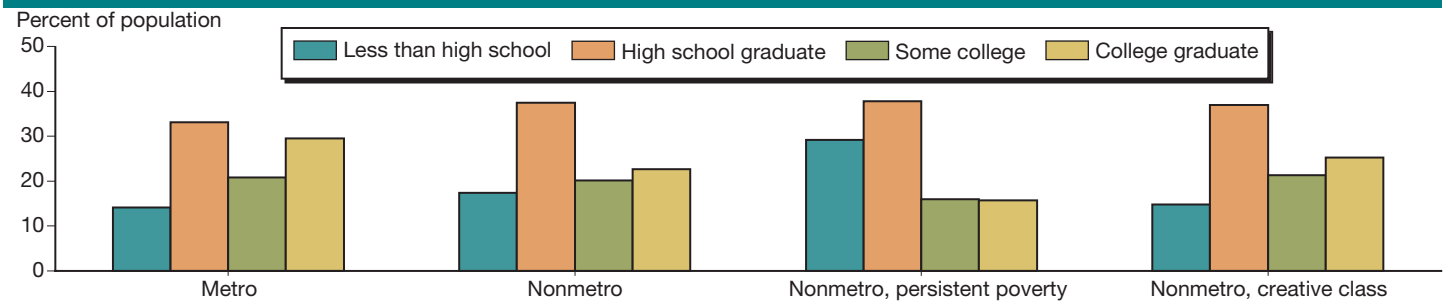
In 2008, older Americans spent more on canned fruit and vegetables than younger households



Source: USDA, Economic Research Service using data from the Bureau of Labor Statistics, Consumer Expenditure Survey.

Rural America

Patterns of educational attainment vary considerably by metro and nonmetro county types

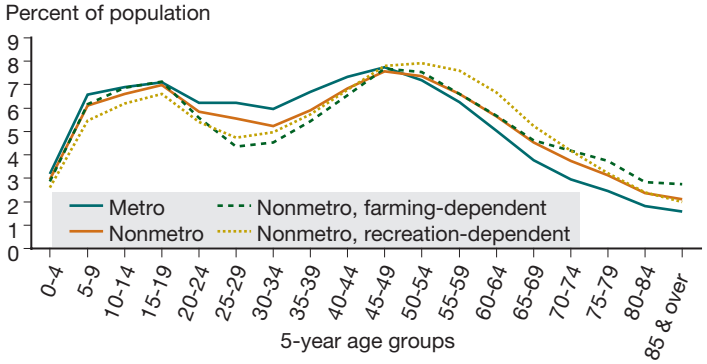


Note: Percent in each educational group is for those age 25 or older, averaged over a 5-year period, 2005-09. Persistent poverty counties have 20 percent or higher poverty rate in the last four decennial censuses. Creative class counties have high proportions of people in highly creative occupations, such as business ownership and top management, science and engineering, and arts and design.

Source: USDA, Economic Research Service using data from the U.S. Census Bureau's American Community Survey.

Rural America

Nonmetro, farming-dependent counties show lowest percentage of young adults, highest percentage of elderly

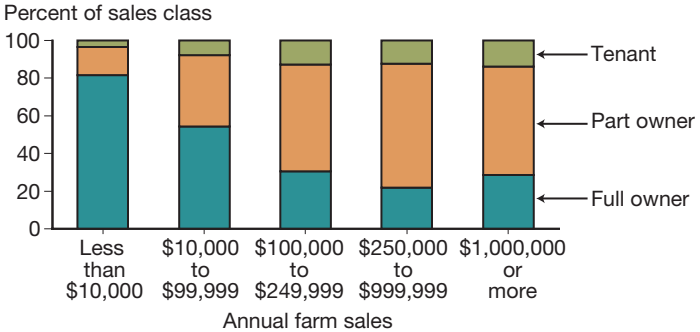


Note: Percent in each age group is the average over a 5-year period, 2005-09.

Source: USDA, Economic Research Service, using data from the U.S. Census Bureau's American Community Survey.

Farms, Firms, and Households

Full ownership is most common among the smallest farms



Note: Tenants rent all the land they farm. Part owners own some of the land they farm and rent the rest. Full owners own all the land they farm.

Source: USDA, Economic Research Service using data from USDA's 2009 Agricultural Resource Management Survey.

On the Map

Location of Agritourism Farms Influenced by Amenities

Agritourism includes such recreational services as hunting and fishing, farm or wine tours, and hay rides. The share of county farms engaged in agritourism is high in the West, where agricultural lands tend to have lower yields due to low rainfall and mountainous terrain. Agritourism farms are also relatively common in sparsely populated parts of Texas, in the Black Belt (from Louisiana to the Carolinas), and in some high-amenity locations benefiting from seasonal residents and tourism, such as in the New England area, in coastal areas in the Eastern part of the U.S, and along the Northern Great Lakes.

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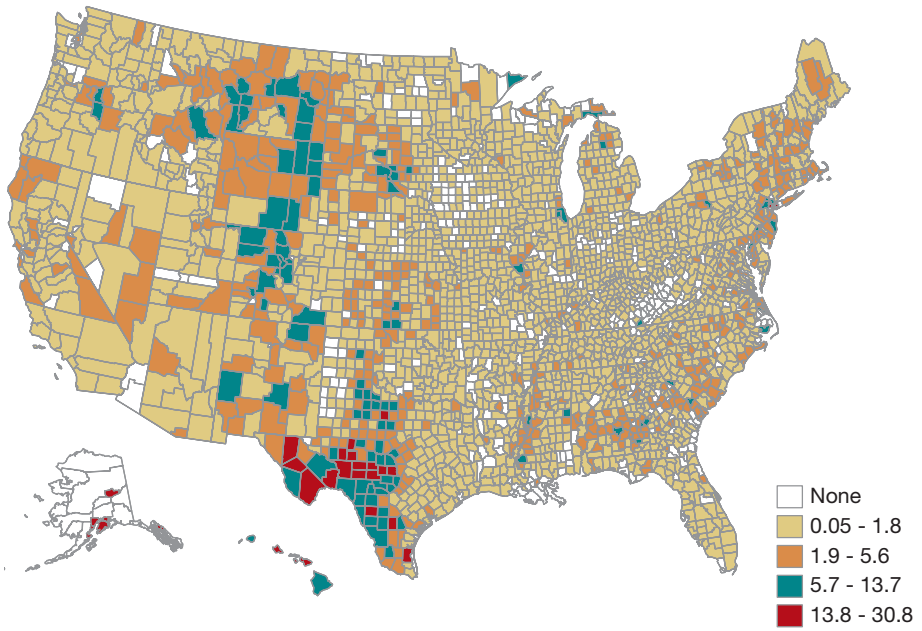
Percent of farms with income from agritourism, 2007



Note: Agritourism and recreational services include income from activities such as hunting, fishing, farm or wine tours, and hay rides.
Source: USDA, Economic Research Service using data from the 2007 Census of Agriculture.

In the Long Run

Food Spending Dipped During Recession

U.S. expenditures on food at home and away from home grew over the past 50 years, but food-away-from-home expenditures increased more rapidly. During the recent recession, however, inflation-adjusted spending on both food at home and away from home fell. After adjusting for price changes using the Consumer Price Index for Food, food-away-from-home spending decreased an average of 2 percent annually between 2007 and 2009, while food-at-home spending declined 1 percent. Inflation-adjusted food spending did not react similarly during the recessions in the early 1970s and 1980s. In both recessions, food-at-home spending was flat, while food-away-from-home spending increased.

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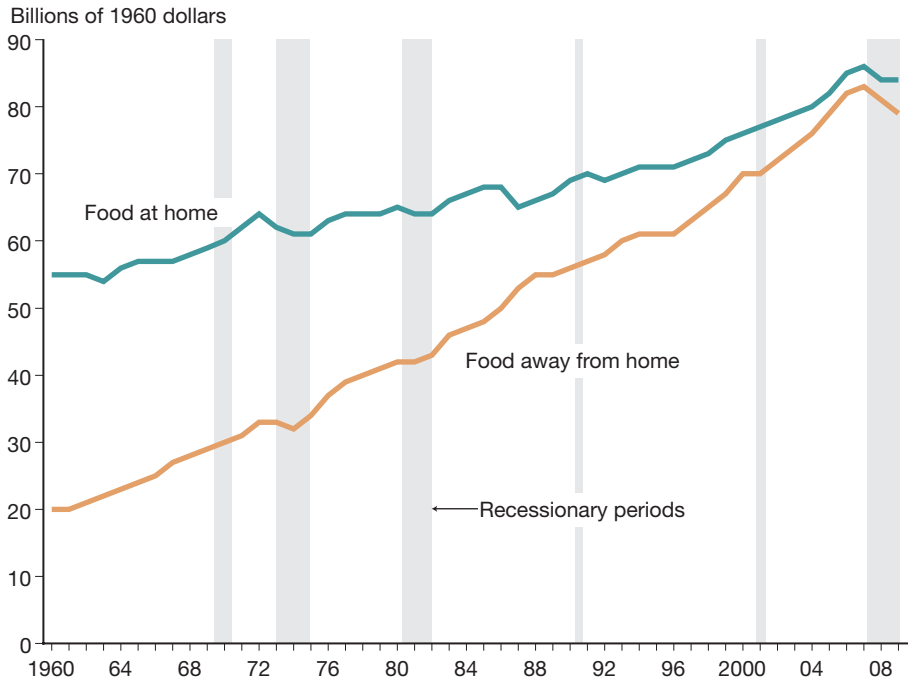
U.S. food expenditures adjusted for inflation



Source: USDA, Economic Research Service. Recessionary periods determined by National Bureau of Economic Research.